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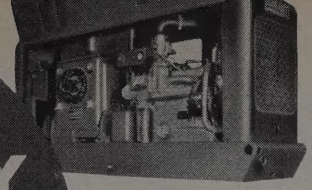

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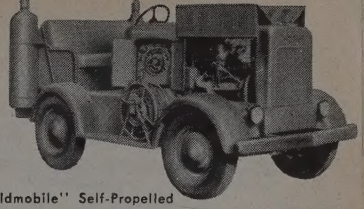

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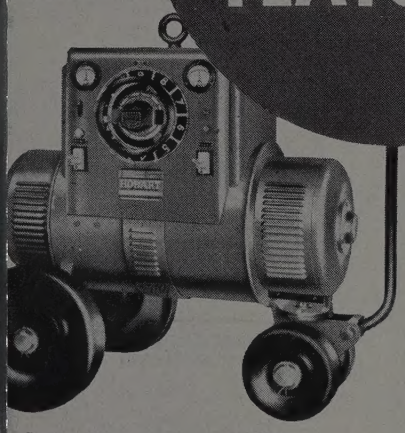

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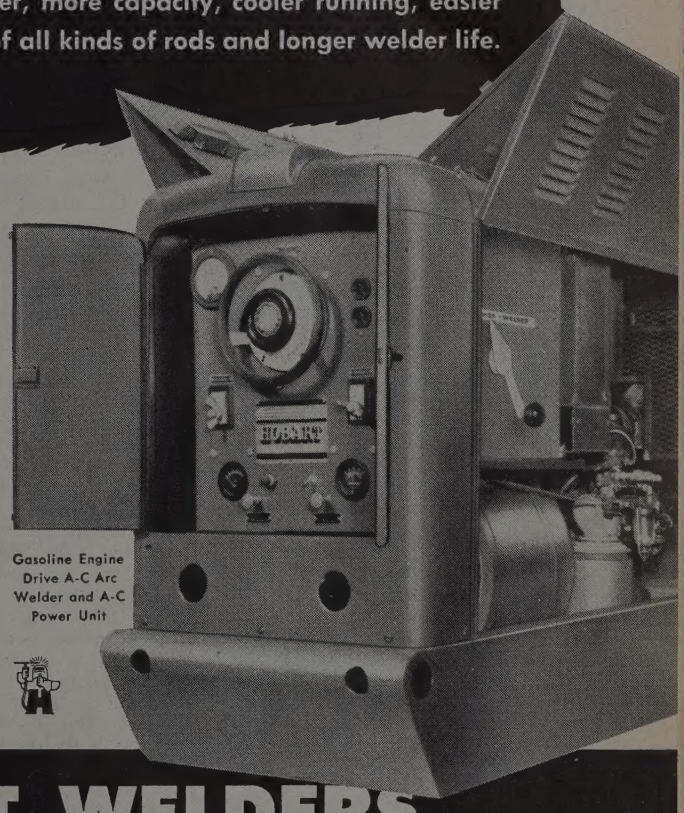

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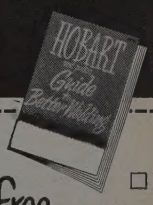

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Behind the Scenes...

Baseball Show

Since this is our October 18 issue, the World Series will be history when you read these words. Right now, while we write this, they are far from being history. In fact, the little radio at our elbow has just reported the end of the second game, and in the hall outside our office an Indian in full war paint, feathers and all, is celebrating the event. In fact, he is hunting another employee of this printshop who was rumored to have bet on the Boston Braves, and with tomahawk raised is screaming for his scalp! That's just one of the thousands of minor episodes which have taken place in this completely insane city of Cleveland during the past week. Outside our windows, we can see the lake-front stadium, where tomorrow the largest crowd in baseball history will assemble, weather permitting, to see the third game. Right outside the ticket window there's a big tent, where one fan has set up housekeeping and where he has been for two days, waiting to be first in line for the unreserved seat sale tomorrow. On every street corner and in every alley there are little men who dart out and ask you if you want to sell any tickets, offering fabulous prices for any seats within shooting range of the infield. Nearly all business has come to a complete standstill, unless it has something to do with baseball. Some of the schools have been dismissed, and our little kindergarten and second grade pair report that in their school, the baseball games come in over the loudspeaker system every afternoon. In fact, the boss just dropped in to suggest that we write no column at all this week, and run instead a big picture of an Indian. We would ordinarily jump at a chance like that, but after all, there *are* other things going on in the world, strange as it seems to all of us here in Cleveland.

Dirty Story

All manner of things come in to our editorial department for possible use on the limited number of pages we have available each week. It would seem that with the number of pages that we now fill, most everything could be used, but a surprising number of items never see the light of day. One such item, which was hurriedly cast into outer darkness last week by our New Industrial Equipment editor has been rescued from oblivion by this foolhardy department, and we would like to present it now. Since this isn't the new equipment department, to which the item came addressed, we don't feel quite at liberty to divulge any names. Suffice it to say that from out of the east came the item with this enduring opening paragraph: "I would like to interest you in my portable telescopic bath tub. This bath tub was invented with the thought of giving people a convenient piece of furniture for taking a bath who do not have bath rooms. It is similar to the davenport couch or folding bed for the people who need additional sleeping facilities without bedrooms." We're merely passing this one along so that all you 14,320,519 people who own homes without bathrooms can take a bath once in a while. (Those figures came along with the release, incidentally, and they also show that Texas wins again, with 936,966 homes without bathrooms).

Metal Show

One of the things which is going on in the world, or which will be going on come next Monday, is the Metal Show. If you hadn't already guessed by the size of it, this is our Metal Show issue. If you are planning to be in Philadelphia for the show, this issue will be a valuable guide to what, where and when. If you're not going to be on hand, you'll find that our editors have succeeded in bringing you in digest form the technical papers which will be presented, a list of who's exhibiting, the entire program, and beginning in our November 1 issue, two weeks hence, will bring you up to date on the show itself and what happened. To those of you who are going to attend, we want to extend a special invitation to come and see us in booth 1744. As in previous election years, we are going to have our voting machines on tap, so that you can vote for the President of the United States in the same hall where he was nominated. Doesn't matter this time who you vote for, because chances are the one you like was nominated right there on the spot! Although we are probably going out on a small limb with this prediction, we will be real bold and say that the candidate who wins our poll will win the election next week! Confidentially, we have been wrong every time in the past, if memory serves us correctly.

Shrdlu

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STEEL

Vol. 123—No. 16 October 18, 1948

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STEEL

The Magazine of Metalworking and Metalproducing

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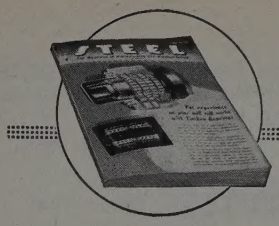

October 18, 1948

Profit Is Expense

One who has access to the numerous services rendered by economic and statistical organizations cannot help but be impressed by the emphasis now being placed upon the subject of corporation profits. Almost without exception, these services advise clients to go to extraordinary lengths to explain to employees that a reasonable profit is essential to the private enterprise system, that profit is not an item for which one should apologize, and that payment to the people whose savings provide the tools of industry is on a par with payment to the men and women who use these tools.

The real point of all of this emphasis on profits is that the clever propaganda of communistic and other destructive forces has found enough response in poorly informed quarters to create a nation-wide incredulity regarding the necessity or desirability of profits. The profit motive of the capitalistic system definitely is on the defensive.

Proponents of the unprecedentedly successful American system are combatting these smear tactics in various ways. One of the most effective is the move of Vanadium-Alloys Steel Co. to present a simplified operating statement in which the amount of money received from customers for goods and services is balanced by expenditures for goods and services bought from others, wages and salaries, depreciation and depletion, taxes and profit. In this simplified statement, profit is not considered to be the balance left after orthodox expenses are deducted from income. It is considered an expense that is on a par with wages and salaries, taxes and depreciation.

Some criticism of this form of report has developed. One critic contends that if the cost of supplying tools (profit) is not met, "the providers of the tools will withdraw them." This is true only to the extent that a company hopelessly in red over a long period will lose stockholders. A company can dip into red now and then without being deserted by its shareholders.

We like the idea of considering profit a legitimate and normal expense of doing business. It is a frank and honest acknowledgment of the tremendously important fact that profit is one of the chief reasons why our economy excels that of any nation in the world.

* * *

SALUTING ALLOY STEEL: Central theme of the 30th National Metal Congress and Exposition, to be held in Philadelphia Oct. 25-29, will be a "salute to alloy steel." Features of the observation of the diamond jubilee of this important ferrous material will include awards to individuals who have made outstanding contributions to the progress and development of alloy steels, presentation of papers on the historical and technical aspects of alloy steels and special exhibits dramatizing the importance of alloy steels to the welfare of the nation.

This commendable and appropriate ceremonial compliment to alloy steel is in addition to the usual conventions of the American Society for Metals, American Welding Society, Institute of Metals division of the American Institute of Mining & Metallurgical Engineers and the Society for Non-Destructive Testing, and the exposition—sponsored by these organizations—at which more than 300 exhibitors will display their products.

The salute to alloy steel has unlimited possibilities. The path of progress from the time

(OVER)

Captain Eads used chromium steel in the bridge spanning the Mississippi at St. Louis until the present has not been smooth. To perfect an acceptable alloy steel is not enough; it has to be introduced to users on a basis whereby its tricky treatment can be mastered by good, bad and indifferent operators in users' shops.

That the steel industry in a single year turned out more than 10 million tons of alloy steel is convincing testimony that producers and consumers have done a marvelous job of development. —p. 130

* * *

GETTING OUT THE STEEL: In the midst of all the hullabaloo over the steel shortage one thing stands out crystal clear, and that is that the steel producers have been doing a magnificent production job in the face of terrific difficulties.

Latest available data show that in the first 9 months this year more steel was produced than ever before in peacetime, total output for the period falling only 2 per cent under that for all of 1946. Production of ingots and steel for castings in the first 9 months amounted to 64,987,478 net tons, up 3.6 per cent over the 62,705,851 tons turned out in the corresponding period of 1947.

This is a record of which the steel men can be justly proud. They have not licked the supply shortage, it is true, but, acutely conscious of their responsibility, they are doing everything within their power to get out the steel. The production figures bear this out. —p. 98

* * *

TRUCK TRAFFIC GROWS: Truck-trailer manufacturers are wondering about the extent to which increased railroad freight rates and the switch to mill pricing systems by the steel and other industries will affect the rising curve of motor transport.

Truck-trailer transport has grown spectacularly during the postwar period. The American Trucking Associations' index of truck loadings in August stood at 237 per cent of the 1938-1940 average. In 1947 the interstate for-hire carriers enjoyed a volume of business exceeding $2½ billion, as compared with slightly more than $7 billion of freight business for the railroads.

In spite of these impressive figures on volume of traffic, the demand for truck-trailers has been declining this year. Production for the first seven months of 1948 was 26,244 units compared with 36,338 in the same period last year. Obviously an increase in demand, resulting from higher railroad freight rates or from mill pricing, would be timely for truck-trailer manufacturers. —p. 101

* * *

A JOB FOR LABORITES: When Paul Hoffman took charge of the European Reconstruction Program, he discovered that, with two exceptions, the governments participating in ERP were labor or socialistic in complexion. It was necessary to convince officials of these governments that the Marshall Plan was a sincere effort to help Europe, and not the "Wall Street plot to gain control of the European economy and to enslave European workers," which the communists claimed it to be.

Mr. Hoffman reasoned that no Americans could "sell" the Marshall Plan to European labor more effectively than well-chosen American labor leaders. He asked Clinton S. Golden of CIO and Bert M. Jewell of AFL to find means of convincing European labor that the Marshall Plan is a constructive effort, solidly backed by American labor.

Their work is beginning to show gratifying results. This is a case in which right-minded labor leaders are in a position to do a job in which men identified with management would be doomed to failure. —p. 104

* * *

PROMOTING HARMONY: A few years ago Cason J. Callaway, a director of United States Steel Corp., originated a movement in Georgia to improve farms. It was known as the Hundred Georgia Better Farms Program. Agricultural experts have hailed it as a most successful undertaking.

Recently Mr. Callaway was host to 148 business and professional Georgians who had cooperated with him in the farm project. Their tour of points of interest in the East and Midwest included an inspection of the steelworks and mills of Carnegie-Illinois Steel Corp. at Gary, Ind. The objective of the tour was to demonstrate the "interdependence of agriculture, small business and big business."

What a magnificent, constructive goal! When so many strong forces are at work sowing seeds for even sharper class conflict than already exists, how refreshing it is to see somebody promoting understanding and a stronger bond of interest! The Callaway formula should be adopted on a wholesale, national basis. —p. 114

E. L. Shaner

EDITOR-IN-CHIEF

News Summary

ALLOCATIONS—Specter of mandatory steel allocations again will rise in the 81st Congress to torment industry. Complaints from consumers on steel distribution have so impressed congressmen dealing with the problems of small business that some who opposed compulsory action during the past year have changed their minds. Some congressional opinion is that mandatory allocations for steel have a 50-50 chance of adoption (p. 97). Meanwhile the voluntary agreements program is grinding to a halt. Reasons: (1) Public Law 395 expires Feb. 28; (2) administration officials are expecting a new boss in January and many expect to be leaving Washington.

PINCH— Sheet and strip steel continues the product in greatest demand, as it has been since the war. Plates, pipe and tubular products follow. These are the products on which STEEL's district editors find the most concern (p. 98). They also are the items which the Macy Committee finds dominant in the steel gray market.

PRICING— Industrial executives believe the Supreme Court's ruling in the cement case outlaws all freight absorption and delivered price systems (p. 100). Generally, they regret the action, believing basing point pricing had sound economic basis . . . . The Capehart committee investigating the pricing question will be given the results of a survey of 3400 midwestern companies (p. 108) on the effects of the pricing change.

PREPAREDNESS— Expansion of the Office of Production in the National Security Resources Board is being watched with interest by industry. This agency, which supervises the phantom order program, is adding new industry advisory committees (p. 101), may play an increasingly important role in rearmament.

TRUCK-TRAILERS— Increased freight rates and a trend toward shorter hauls for steel products as result of pricing changes are being watched carefully by manufacturers of truck-trailers for implications on future demand for their product (p. 101). Few people realize the trucking industry does a volume of business exceeding $2.5 billion annually.

LABOR IN DIPLOMACY— American labor leaders have helped sell the European Recovery Plan abroad and are gaining new recognition for their accomplishments as foreign representatives (p. 104). This development springs not from a pro-labor administration but from a management representative—Paul Hoffman, ECA administrator—who has added experienced labor leaders to his advisory staff and placed them in other positions of importance in the aid program.

FOREIGN— Forty billion francs will be spent for equipment for the basic industries of France under the European recovery program. A large portion of this will be allotted to electric power projects. Coal production, agricultural implements and the railroads also will share heavily (p. 109). . . . ECA has started a trial run of newly developed procedures for administering the reconstruction program in China. American Engineering firms are being asked to direct the projects . . . . Economic ties between Germany and other western European countries are being tightened.

HERE AND THERE IN INDUSTRY— Willys-Overland held tooling costs for 10 new models to $8.2 million (p. 111) . . . . Population growth and shifts during and since the war are responsible for some perplexing distribution and manpower problems in the metalworking industries (p. 107) . . . Standardization of lubricating fluids for automatic transmissions is a need being recognized by the automotive industry (p. 112) . . . . Carpenter Steel Co. has completed a substantial portion of its postwar expansion program, which includes a new metallurgical laboratory (p. 114) . . . Student scientists (p. 106) may be deferred under the new draft act . . . .Steel industry's hourly wages hit a new alltime high in August at $1.689 (p. 107). Employment is at a postwar high . . . . John L. Lewis' United Mine Workers already has launched a campaign for a fourth round of postwar wage increases (p. 103).

Engineering News, p. 125 *Market Summary, p. 223*

KEY FEATURES OF A COMPLETE STEEL SERVICE

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SHEETS—hot & cold rolled, many types & coatings
TUBING—seamless & welded, mechanical & boiler tubes
STAINLESS—Allegheny metal sheets, plates, bars, tubes, pipe, etc.
REINFORCING—bars & accessories, wire mesh, etc.
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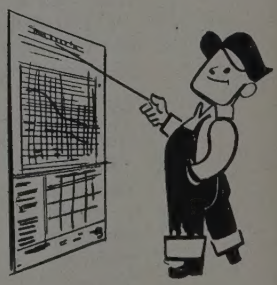

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STEEL
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Mandatory Steel Allocations?

Issue to be revived in next Congress as result of expressions of dissatisfaction with distribution under current system. Voluntary program grinds to halt

MANDATORY allocations for steel again will be demanded in the 81st Congress and, according to belief in some congressional circles, stand a 50-50 chance of adoption.

This belief stems from a flood of complaints and expressions of dissatisfaction from steel consumers who are not getting as much steel as they believe they should receive. The complaints have impressed the congressional groups to which they have been addressed, principally those dealing with small business problems.

Some congressmen who opposed mandatory allocations proposals during the 80th Congress are reported switching over in favor to compulsory action.

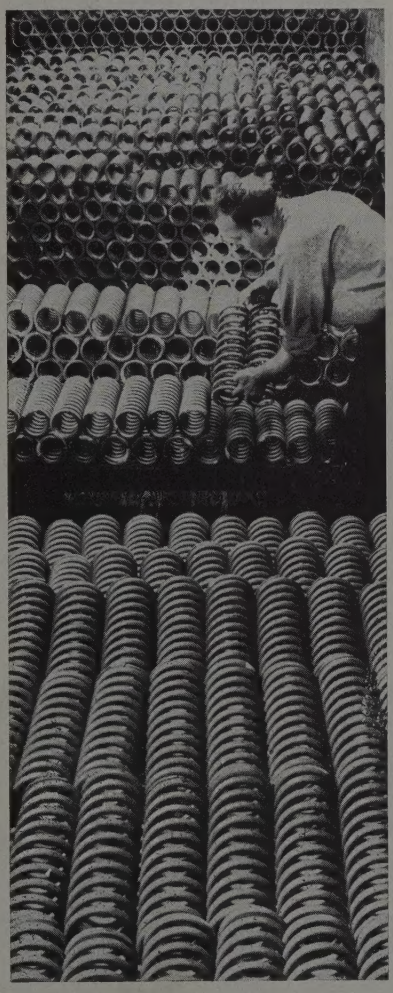
Voluntary Program Grinds to Halt—Meanwhile, Secretary of Commerce Charles Sawyer advises industry that the voluntary agreements program for new allocations of steel is coming to a stop. Industrial users of steel can expect few, if any, new programs to be developed under Public Law 395, due to expire Feb. 28.

Steel mills, he points out, generally require 60 days "lead time" to schedule production on specific orders. Before a program can be adopted, study and numerous conferences among industry and government officials are required. Then agreements must be submitted to the attorney general for approval, following which public hearings on the program must be held. Time required for all these steps, added to the required lead time, virtually preclude any new programs.

Security May Be Exception—Mr. Sawyer says that the door on all new action has not been finally closed. Exceptions may be made for urgent new programs directly related to national defense, most of which could be operated on a mandatory basis, after Public Law 395 expires, under the provisions of the draft act.

The cut-off of new programs does not preclude possible continuation of programs already approved for six months after Mar. 1. The law permits programs that are in operation at that time to continue on a unilateral request basis for a run-off period of up to six months.

Many Ready to Leave—Anticipating a Republican victory in November and a change in administration next January, many top officials are preparing to leave Washington. They are not anxious to start new programs on the eve of their departure. They anticipate the possibility of a gap or lapse in the allocations program as result of the probable change in administrations.



Should mandatory steel allocations come, probably less steel would be available for passenger car manufacture. Shown above is a receiving dock for thousands of coil springs at the Chevrolet Gear & Axle Plant, Detroit

Also, they point out that the National Security Resources Board, which several weeks ago set up a task committee to study and plan for wartime controls, is not planning any type of allocations controls short of an emergency.

Interior Attacks Voluntary Program—One of the most bitter attacks on the steel industry's participation in the voluntary agreements program was unleashed last week by Acting Secretary of Interior C. Girard Davidson. He charged the steel producers with "jettisoning" the voluntary program and supplying steel for less essential and "even frivolous" purposes while failing to make adequate quantities of steel available to the oil and gas industries.

In a letter to members of the Steel Products Advisory Committee, Secretary Davidson charged that the steel mills expect to supply adequate materials only to line pipe mills, as distinguished from drill pipe, tubing, casing and other oil country goods, and only to such line pipe mills as are integrated with the steel producers. The industry, he pronounced, has "a solemn obligation to provide for our basic national requirements."

Copper Supplies To Tighten

COPPER supplies for industrial use will become tighter over the next eight months as result of procurement for stockpiling.

The Munitions Board is asking that 90,000 tons of refined copper be delivered for stockpiling by next June 30. This is in addition to 30,000 tons already under contract for stockpiling purposes. This means an average of 13,300 tons monthly will be taken from current consumption.

While copper supplies generally have been tight since the war, the tonnage available from domestic production, reclamation of secondary copper and imports was supplemented by releases from the war stockpiles of the Reconstruction Finance Corp. over the past two years. Now copper will be flowing in the other direction, into, rather than out of, stockpiles.

Domestic mine production of copper in 1947 averaged 70,630 tons monthly, according to the Bureau of Mines. For the first seven months of 1948, mine production in this country averaged 73,002 tons monthly.

Tight Steel Supply Persists

Consumers' needs unsatisfied despite substantial increase in production. Pricing change and allocations contribute to distribution dislocations

DESPITE an increase of more than 2 million tons of ingots this year in the nation's production, steel consumers generally report no improvement in finished steel supply conditions, and many claim they are not getting as much as a year ago.

Various reasons are ascribed for this. For one thing, withdrawal of producers from certain markets to concentrate sales in areas close to their producing plants is being felt keenly by consumers in the various districts. This trend, underway for several years past, has been accentuated in recent months by abandonment of basing point pricing.

Could Use More—Buyers of some products claim they are not getting as much tonnage as they did prewar, but they are the exceptions. Other buyers admit they are getting as much steel as formerly, but contend they are not receiving anything like the amount they could use.

In another category are those who started in business during, or since, the war, and who have no established ties with the mills. These consumers are in the worst position of all.

Voluntary allocation of tonnage to preferred programs, such as the railroads, petroleum industry, etc., of course, are blamed for much of the supply difficulties. In plates, for example, fully one-third of total output in fourth quarter is earmarked for allocation. Chief shortages continue in sheets and strip, plates, and pipe. Bars and shapes are in less stringent supply though tight and military requirements for the alloy grades are being reflected in increased demand.

STEEL's district editors report:

Chicago

WITHOUT exception, opinion of representative metalworking firms in the Chicago area is that the pinch in supply has tightened further. And the shortage extends to stainless and other alloy grades. It's hard to establish which particular product is tightest, but the view holds that sheet and strip are scarcest, closely followed by plates and pipe.

Wide flange beams and angles are particularly difficult to obtain. Among plate consumers there is little solace to be obtained from the overall voluntary allocation tonnage figures, because so much of this product is being channeled from regular consumption.

New York

BROADLY speaking, consumers of sheets, plates and merchant pipe are having the most difficulty here. Shapes and bars are in less stringent supply, although also short of requirements.

Distributors, for the most part, are being supplied with tonnage on a month-to-month basis, and are finding it impossible to keep inventories in balance.

Consumers of boiler tubing find some leading producers booked up to the middle of next year, with books closed for beyond.

Many plate consumers claim they are having more difficulty getting tonnage than during the war.

Consumers of cold drawn carbon bars report inventories in fairly good shape.

Shape supply still lags behind requirements, with structural fabricators reporting unbalanced stocks and jobbers having difficulty maintaining even a semblance of normal inventory.

Pittsburgh

METALWORKING companies say plates and sheet are the most difficult steel products to obtain.

While steel mill production schedules are expected to reach new record levels throughout fourth quarter, shipments to many metalworking concerns will be reduced because of mill commitments to preferred industries under the voluntary allocations. In some instances fourth-quarter monthly mill allotments have been further reduced through effort on part of mills to make up carryover tonnage. Another factor adversely affecting steel supply here is reported decision of at least one mill to partially withdraw from this market in effort to concentrate on distribution of steel within its marketing areas.

Baltimore

CURRENT stringency in steel is particularly noticeable at the jobber

Steel Production Hits New Peacetime High Level

PRODUCTION of steel established a new peacetime high in the first nine months of 1948 and was only 2 per cent less than the total for all of 1946, according to the American Iron & Steel Institute. It is now estimated production for the full year will approximate 87 million tons, the third largest in history.

Output of ingots and steel for castings in the first nine months of this year totaled 64,987,478 tons, an increase of 3.6 per cent over the 62,705,851 tons made in the like 1947 period. Steelmaking furnaces were operated at an average of 92.1 per cent of capacity during the first three quarters of this year compared with an average of 91.9 per cent during the first nine months of 1947.

During third quarter, production totaled 21,920,200 tons, compared with 21,046,163 tons in the second quarter and 20,367,294 tons, in the third quarter of 1947. Production during September totaled 7,413,934 tons against 7,437,608 tons during August and 6,797,457 tons in September, 1947. Steelmaking furnaces were operated at an average of 96.1 per cent of capacity during September, highest average thus far in 1948.

	Estimated Production—All Companies									
	Open Hearth		Bessemer		Electric		Total		Calculated weekly production Net tons	Number of weeks in mo.
	Net tons	Per cent of capac.	Net tons	Per cent of capac.	Net tons	Per cent of capac.	Net tons	Per cent of capac.		
1947										
1st 6 mos.	38,328,096	95.4	2,177,701	85.2	1,832,760	72.8	42,338,557	93.5	1,636,589	25.87
2nd 6 mos.	38,545,697	94.4	2,054,842	79.1	1,954,975	76.4	42,555,514	92.6	1,619,928	26.27
Total	76,873,793	94.9	4,232,543	82.1	3,787,735	74.6	84,894,071	93.0	1,628,195	52.14
1948										
Jan.	6,768,497	95.5	343,169	77.5	361,110	79.0	7,472,776	93.6	1,686,857	4.48
Feb.	6,245,338	94.3	340,596	82.3	354,270	82.9	6,940,204	93.0	1,676,378	4.14
Mar.	6,841,578	96.6	363,235	82.0	403,322	88.2	7,608,135	95.3	1,717,412	4.43
1st qtr.	19,855,413	95.5	1,047,000	80.6	1,118,702	83.4	22,021,115	94.0	1,693,932	13.00
Apr.	5,640,168	82.2	185,089	43.2	392,900	88.7	6,218,157	80.4	1,449,454	4.29
May	6,799,289	96.0	355,562	80.3	416,801	91.1	7,571,652	94.8	1,709,177	4.43
June	6,481,879	94.5	356,810	83.2	417,665	94.3	7,256,354	93.8	1,691,458	4.29
2nd qtr.	18,921,336	90.9	897,461	69.0	1,227,366	91.4	21,046,163	89.7	1,617,691	13.01
1st 6 mos.	38,776,749	93.2	1,944,461	74.8	2,346,068	87.4	43,067,278	91.9	1,655,797	26.01
July	6,348,057	89.8	324,991	73.6	395,610	86.7	7,068,658	88.7	1,599,244	4.42
*Aug.	6,631,157	93.6	371,205	83.8	435,246	95.2	7,437,608	93.1	1,678,918	4.43
†Sept.	6,591,611	96.3	387,153	90.5	435,170	98.5	7,413,934	96.1	1,732,228	4.28
†3rd qtr.	19,570,825	93.2	1,083,349	82.5	1,266,026	93.4	21,920,200	92.6	1,669,474	13.13
†9 mos.	58,347,574	93.2	3,027,810	77.4	3,612,094	89.4	64,987,478	92.1	1,660,385	39.14

* Revised. † Preliminary figures subject to revision.

warehouses, where total stocks in some cases represent no more than 20 per cent of normal and where in some products inventories are virtually nil.

Flat-rolled products are possibly the most scarce items carried by general jobbers, but shapes are not far behind.

One leading fabricator here recently remarked that it was possible that when and if a break develops it will be found many consumers had more steel on hand than generally believed.

Reinforcing bar inquiry continues to far exceed supply.

Cincinnati

CONSUMERS in the Cincinnati district are getting enough steel to maintain a fair level of operations, but smooth planning is out of the question in many cases.

In plates and sheets, for example, the fortunate fabricator has an inventory but of the kind which may or may not be suitable for the work at hand. The situation means delayed deliveries, shop inefficiency.

Some users of bars, shapes and structurals find it impossible to get required steel from regular sources, and the gray market provides it, at price advance of 25 per cent up.

Pipe in smaller sizes is in fair supply although there is constant worry lest inventories shrink.

GRAY MARKET

BETWEEN 10 and 12 per cent of total sheet and strip output, or about 2 million tons a year, is being sold in the gray market. This is the estimate of the House Subcommittee To Investigate Questionable Trade Practices, headed by W. Kingsley Macy (Rep., New York), in a report on nine months of investigation of the gray market. Committee also reported:

Sheet and strip, plates and pipe are the leading products in the gray market.

Profits in gray market transactions have been fantastic, with prices for flat-rolled products running up to 300 per cent of the established mill prices.

Major steel producers have been unanimous in their condemnation of the gray market. The committee, however, suggested the mills should use more diligence in policing their accounts.

Youngstown

YOUNGSTOWN'S chief steel consumers, located right in the shadow of some of the biggest steel mills, are short of steel—and they're unhappy about the future. The shortage for early next year threatens to become worse instead of better.

The steel users say they have been getting enough metal to keep going, but "it is always a nip and tuck battle," and they are forced to turn away business.

Dallas

FABRICATORS in the Dallas area report supply procurement is the worst it has ever been. None can be found who could not handle more steel in all categories.

The most critical shortages reported are in pipe, wide flange structural shapes and plates.

The larger structural steel concerns are getting supplies short of capacity, little ones even less.

DISTRIBUTION OF STEEL PRODUCTS FOR AUGUST AND YEAR TO DATE

Steel Products	Number of companies	Items	AUGUST - 1948			To Date This Year			Whole Year 1947		
			Net Shipments (Excluding Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale) (Net Tons)	Per cent of Total Shipments	Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale (Net Tons)	Net Shipments (Excluding Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale) (Net Tons)	Per cent of Total Shipments	Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale (Net Tons)	Net Shipments (Excluding Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale) (Net Tons)	Per cent of Total Shipments	Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale (Net Tons)
Ingots, blooms, billets, tube rounds, sheet and tin bars, etc.	45	1	238,903	4.5	288,151	*2,011,412	4.7	*2,148,598	2,966,748	4.7	2,396,343
Structural shapes (heavy)	12	2	336,446	6.3	1,676	2,767,919	6.5	17,097	4,436,129	7.0	2,640
Steel piling	4	3	26,146	0.5	23	196,305	0.5	1,106	324,224	0.5	23
Plates (sheared and universal)	29	4	553,089	10.4	29,546	4,499,525	10.5	249,659	6,345,216	10.1	219,227
Skelp	6	5	16,516	0.3	48,374	100,287	0.2	284,815	160,989	0.3	384,004
Rails—Standard (over 60 lbs.)	4	6	164,413	3.1	1,294	1,290,552	3.0	8,521	2,207,146	3.5	991
—All other	5	7	13,457	0.3	79	146,968	0.3	922	211,900	0.3	329
Joint bars	7	8	10,838	0.2	3,805	91,618	0.2	26,661	173,923	0.3	15,198
Tie plates	7	9	42,188	0.8	52	330,518	0.8	322	504,779	0.8	4,437
Track spikes	8	10	11,690	0.2	175	92,596	0.2	524	163,746	0.3	146
Hot Rolled Bars—Carbon	34	11	480,076	9.0	54,410	4,047,024	9.5	408,969	6,242,416	9.9	745,770
—Reinforcing—New billet	16	12	101,025	1.9	566	875,938	2.0	4,552	1,277,075	2.0	9,775
—Rerolled	13	13	19,253	0.4	-	140,098	0.3	-	175,833	0.3	-
—Alloy	27	14	155,617	2.9	17,299	1,230,849	2.9	150,689	1,741,432	2.8	212,382
—Total	44	15	755,971	14.2	72,275	6,293,909	14.7	564,210	9,436,756	15.0	967,927
Cold Finished Bars—Carbon	28	16	109,868	E.1	744	864,917	2.0	4,212	1,426,701	2.3	9,249
—Alloy	27	17	21,444	0.4	554	147,303	0.4	4,507	218,802	0.3	2,601
—Total	35	18	131,312	2.5	1,298	1,012,220	2.4	8,719	1,645,503	2.6	11,850
Tool steel bars	18	19	8,005	0.2	187	56,869	0.1	1,295	87,279	0.1	1,670
Pipe & Tubes—Butt weld	15	20	165,708	3.1	2,663	1,293,357	3.0	17,858	1,892,691	3.0	78,080
—Lap weld	8	21	26,736	0.5	-	222,789	0.5	3	389,762	0.6	875
—Electric weld	13	22	139,720	2.6	310	1,004,399	2.4	3,274	1,254,325	2.0	4,274
—Seamless	17	23	230,680	4.3	11,102	1,889,100	4.4	110,417	2,581,106	4.1	157,208
Wire rods	20	24	40,583	0.8	30,305	403,490	1.0	208,202	667,282	1.1	331,192
Wire—Drawn	39	25	213,449	4.0	14,499	1,736,360	4.1	116,906	2,590,963	4.1	181,783
—Nails and staples	17	26	72,465	1.4	1,086	566,958	1.3	8,863	799,436	1.3	8,481
—Barbed and twisted	15	27	19,725	0.4	305	168,903	0.4	399	256,991	0.4	128
—Woven wire fence	13	28	32,951	0.6	260	264,827	0.6	2,399	407,295	0.6	3,616
—Bale ties	11	29	9,500	0.2	-	80,266	0.2	-	119,917	0.2	-
Black Plate—Ordinary	9	30	63,574	1.2	-	528,676	1.2	654	801,745	1.3	2,033
—Chemically treated	2	31	810	-	-	9,505	-	-	19,252	-	-
Tin and Terne Plate—Hot dipped	8	32	194,175	3.6	16	1,392,860	3.3	210	2,093,149	3.3	228
—Electrolytic	9	33	148,920	2.8	-	1,160,200	2.7	215	1,617,659	2.6	589
Sheets—Hot rolled	32	34	634,570	11.9	49,915	5,082,284	11.9	422,430	7,891,798	12.5	578,426
—Cold rolled	16	35	555,708	10.4	2,411	4,424,241	10.4	13,794	5,504,578	8.7	28,498
—Galvanized	16	36	137,654	2.6	272	1,073,318	2.5	1,981	1,609,881	2.5	889
Strip—Hot rolled	23	37	130,186	2.4	29,019	1,079,476	2.5	231,629	1,740,085	2.7	308,655
—Cold rolled	34	38	156,424	2.9	2,145	1,151,547	2.7	16,175	1,613,005	2.6	28,030
Wheels (car, rolled steel)	5	39	28,451	0.5	68	217,115	0.5	726	356,873	0.6	2
Axles	5	40	18,097	0.3	6	136,606	0.3	103	185,019	0.3	53
All other	-	41	-	-	-	-	-	-	-	-	-
TOTAL STEEL PRODUCTS	140	42	5,329,060	100.0	591,317	42,776,975	100.00	*4,468,687	63,057,150	100.0	5,717,765

* Adjusted.

Pricing Change Opposed

Majority of industry executives feel switch to f. o. b. pricing will adversely affect economy

OPINION survey by the National Industrial Conference Board indicates industry executives in general think the Supreme Court's ruling against basing point pricing in the cement industry outlaws all freight absorption or delivered price methods.

Several industries, including steel, cement, refractory brick, and some chemical branches, have already switched to f.o.b. mill pricing on the assumption the ruling applies to them. Other industries are reviewing their pricing policies.

While the majority of executives feel multiple basing point pricing has a sound historical and economic basis and should be continued, a few think otherwise. One said the old system was arbitrary and contravened natural economic laws, throwing out the economics of location.

Not Affected—A number of industries report the Supreme Court ruling does not affect them as their own policy has always been f.o.b. at the mill.

Detrimental effects which will be fostered by the change in pricing, as seen by the industry leaders, include, principally, reduction in competition, raising of costs and prices, and dislocation of industry.

Smaller companies, it is felt, may be adversely affected, especially one-plant organizations which, by virtue of freight absorption, have been able to compete on a nation-wide basis. A few officials think the basing point ruling may help the small companies, however, pointing out that the shortage of steel has resulted in the mills informally allocating tonnage to the most profitable outlets, and that with an f.o.b. mill price the smaller firms now will get a better break with respect to supply.

Asks FTC To Drop Its Complaint

ASSERTING that the Federal Trade Commission is misleading the public and Congress in its attempts to forbid freight absorption in selling prices without legislative consent, eight corn products manufacturers last week asked the commission to drop its complaint against them and permit Congress to act upon the general issue involved. The commission would compel net factory mill pricing instead of the traditional basing point system used in the industry.

Battleships with their heavy steel needs may be "mothballed" in favor . . .

Light or Heavy Steels for Defense?

LIKE boxers who modify their style from power punching to swift attack, the Navy and other armed services are shifting emphasis from huge battleships and heavy guns to more modern lighter, faster, weapons, with consequent modifications in steel requirements from heavy forged products to light rolled sheets.

In an action which could be the forerunner of more widespread changes, the Navy is "mothballing" the 45,000-ton USS Iowa, above, at San Francisco. At the same time the Navy has rebuilt its seaplane tender, USS Norton Sound, into a "Buck Rogers" ship for firing various types of rockets and for launching high altitude balloons. Scene below shows the special rocket launching racks installed on the after deck. Note the deck's metal sheathing.

of rockets and rocket-launching craft like this, using lighter steels

Production Office Expands

NSRB's branch which deals with phantom war orders adds industrial equipment committee

NATIONAL Security Resources Board's Office of Production will be expanded with establishment of an Industrial Equipment Industry Advisory Committee. Key role to be played by this office of NSRB in defense production plans has already been indicated by its phantom order program for the machine tool industry.

Appointment of the personnel for the group will be handled by Frank M. Shields, consultant on manufacturing industries at the Office of Production.

The proposed Industrial Equipment Industry Advisory Committee is to embrace these products: Ovens and furnaces, foundry equipment, woodworking machinery, welding equipment, tools and dies, cutting tools, and metal forming and shaping equipment. Representatives will be chosen from the industries producing these products. In line with policy agreed on by the NSRB and the Munitions Board, the committee will be used jointly by the two organizations, to be called into session by the board that has particular matters to discuss with the committee at the moment.

Inquiry at the NSRB reveals that many more industry advisory committees remain to be appointed. This is in line with NSRB's policy of consulting with and obtaining advice from specific industries on matters concerning them.

In the meantime, two more NSRB appointments have been made. John P. Kottcamp, former vice president, Johns-Manville Products Corp., will head the construction materials division, and John D. Mylrea, Mosinee Paper Mills Co., Mosinee, Wis., will direct the forest products division. Both men will be responsible for mobilization planning for industries in their respective fields.

Military Progress on Parade

SECRETARY of Defense James Forrestal has invited representatives from industry, labor, the press, and other segments of the population to attend a conference Nov. 8-18 to familiarize them with the progress of the National Military Establishment. Similar conferences will be held in the future.

Group will attend sessions at the Pentagon from Nov. 8-12. Following completion of this portion of the meeting, group will be flown to observe two-day field demonstrations by each of the three departments in various parts of the country.

U.S. Electrical Men Go to Korea

GROUP of electrical engineers and technical specialists under the direction of Loyal Ross Milburn, a consulting electrical engineer from Detroit and formerly electrical engineer with Great Lakes Steel Corp., flew from Seattle last week for Korea to assist in rehabilitation of Korean electric power generation and distribution systems. Committee is sponsored by the Army and will remain in Korea several months.

Accurate Statistics Essential

VOLUNTARY steel allocations, preliminary European Recovery Program allotments and other important national undertakings, make complete and accurate industry-wide statistics more important today than ever before, George S. Rose, secretary of the American Iron & Steel Institute, last week told members of the Metal Manufacturing Division, Controllers Institute of America.

In addition, he said, this country is moving into both political and economic situations where the margin for error is growing consistently smaller. "One mistake can prove serious, for industry, for the country or perhaps the world," he added. "So we must have the proper facts if we are to do the job right."

He reported legal aspects of collection and dissemination of industry statistics have been fairly well settled, although not many cases involving this question have been brought before the Supreme Court.

"It is no longer possible," Mr. Rose said, "for business to give convincing answers to questions or criticisms without putting facts on the line. Industry cannot sell itself without the facts. It is up to each of us to collect the facts and circulate them as widely as possible—to employee groups, to the community and to the general public."

Trade Gap Narrows

FOREIGN trade gap between exports and imports narrowed further during August with exports declining by $34 million from July, while value of imports rose $39.9 million, according to the Department of Commerce.

Exports fell from $1,022,200 in July to $988,200,000 in August. Imports moved from $558,500,000 in July to $598,400,000 in August. The gap between the two was $389,800,000 in August, compared with the July gap of $463,700,000 or the June gap of $397,900,000. August exports were the lowest since October, 1946. Exports in the first eight months of this year totaled $8,567,100,000, compared with $9,828,800,000 in 1947's first eight months. Respective figures for imports were $4,643,400,000 and $3,712,300,000.

Trailer Outlook Brighter

High rail rates, mill pricing seen stimulating truck-trailer demand

INCREASED railroad freight rates and a trend toward shorter hauls in delivery of steel as a result of mill pricing are looked to hopefully as a stimulus to demand for truck-trailers.

Although truck-trailer manufacturers, like most other metalworking companies, have difficulty obtaining sufficient steel, it is not their only problem. Being one of the first industries in which postwar supply overtook demand, and with demand then turning downward, the truck-trailer producing group is deeply interested in current sales.

Reflecting the decline in demand for truck-trailers, a Bureau of the Census report shows that in the first seven months of 1948 truck-trailer shipments totaled only 28,239 units, compared with 35,277 in the corresponding period of 1947.

Output Down—Production also is down, the output in the first seven months of 1948 being 26,244 units, compared with 36,338 in the like period of last year. July production was the second lowest of the year, 3429 units, the drop attributed largely to vacation shutdowns and a strike at an axle-producing plant. Although shipments exceeded production by 1995 units in the first seven months of 1948 and by 2276 in all of 1947, the industry apparently has been drawing on its inventories of completed truck-trailers, the production in 1946, for instance, having exceeded shipments by 3233 units.

Production and shipments in units and value of shipments follow for 1948:

	Production	Shipments	Value
Jan.	3373	3303	$ 9,216,540
Feb.	3454	3764	11,258,867
Mar.	4137	4573	13,339,449
Apr.	4116	4736	13,313,997
May	3688	3985	11,544,799
June	4047	4113	12,108,978
July	3429	3765	11,200,095

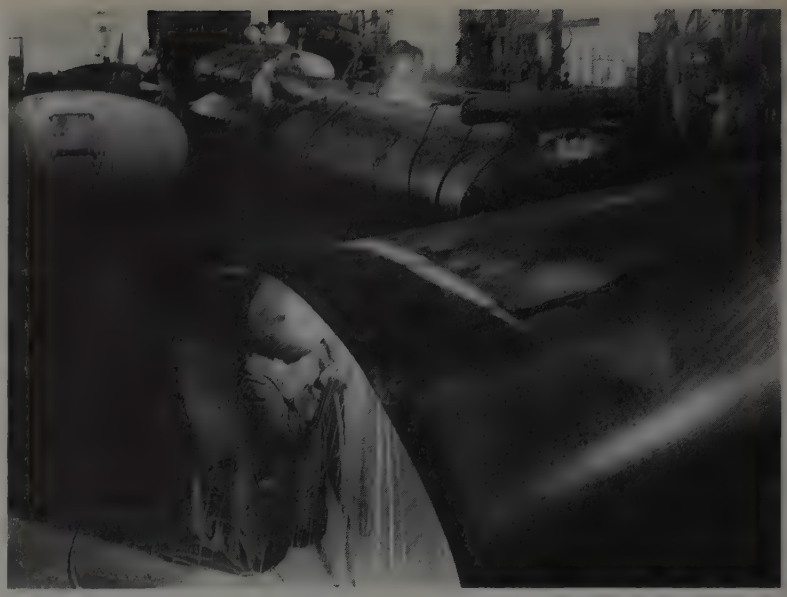
Motor Transport Grows—Although it is too early to have a statistical

measure of the increase in motor freight transport caused by the raise in rail freight rates, the truck-trailer industry has noted a growing interest in motor transport. In August, the American Trucking Associations' index of truck loadings at 237 per cent of the 1938-1940 average was equal to the 1948 high recorded in June.

Not only are increased rail freight rates expected to boost interest in motor transport, but so is the recent switch by the steel industry, as well as several other important industries, to a mill pricing system. With the buyer paying all the freight, it is expected that when steel becomes readily available he will buy from the nearest mill. This means relatively short hauls, a natural for motor transport. Currently, the heavy and widespread demand for steel is producing a substantial volume of small shipments, also a natural for motor transport. The heavy demand for steel also has resulted in a considerable amount of intercompany trading of steel, thereby generating a great deal of motor freight. Many companies which normally would buy carload quantities are now picking up five to ten tons of steel where they can find it. Reflecting the heavy movement of steel, motor carriers of iron and steel reported their August traffic volume rose 38.7 per cent over that of August, 1947.

Big Business — In his annual report, E. J. Buhner, president of the American Trucking Associations, said recently: "When I tell bankers or economists or just plain businessmen that in 1947 the interstate for-hire carriers alone did a volume of business in excess of $2½ billion, they are amazed. They had no idea we had grown to such size. Then, when I have pointed out that last year railroads did only a little over $7 billion of freight business, they seem staggered to think we have obtained such a high percentage of the total, and, approximately 35 per cent is high by any standards."

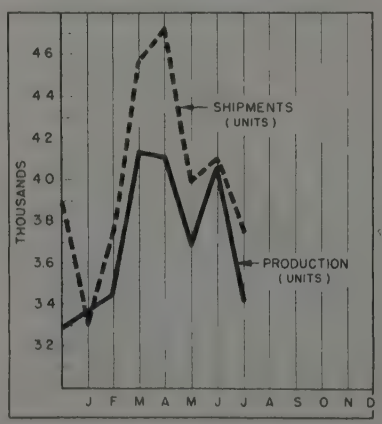
With production in most cases up to demand, truck-trailer producers are ready to take in stride any increase in orders. There are of course, some exceptions, one of them being petroleum tanks, the Truck-Trailer Manufacturers Association Inc., Washington, points out. Also, production of custom body types has been rather slow because of shortage of materials and the fact the larger trailer plants have been trying to maintain long production runs of standard models as an economy measure. With many types of standard production truck-trailers being immediately available, some of them through modification at trailer company branches or factories can be utilized to meet customer requirements without the long delay encountered in obtaining custom-built units.



Although supply equals demand for most types of truck-trailers, an exception is tank trailers, some of which are shown under fabrication in a West Coast manufacturer's shop

Most Plants on Single Shift—The truck-trailer industry is almost entirely on a single-shift basis, for manufacturers have found premium rates, lower efficiency and the added cost of supervision make second shifts all but prohibitive. Despite all efforts to hold costs down, several of the larger truck-trailer companies have been forced to increase prices in the last several months. One company which increased its prices in August reported that moves to beat the increase brought the equivalent of two months' business in one weekend. Price, however, is said not to be necessarily a determining factor in a motor carrier's purchase of new equipment, since amortization or depreciation of all equipment, trucks, trailers, etc., amounts to only about 3 per cent of the carrier's expense of operation. Nevertheless, finance is a problem for many carriers, inasmuch as their fixed rates and mounting expenses have resulted in very narrow profit margins.

TRUCK-TRAILERS—1948
(Production and Shipments)



Offers New Highway Tractor

TO EASE the pinch of governmental restrictions on trucking operations, Autocar Co., Ardmore, Pa., has developed a new short wheelbase cab-over-engine highway tractor. It is designed to comply with severe limits imposed by some states on overall tractor and trailer wheelbase length without loss of either power or payload. The new model comes in wheelbases of 96 and 106 in.

Rail Steel Men Meet in Canada

COMPARISON between Canadian and American methods of production was one of the highlights at the recent meeting of the Rail Steel Bar Association in the Royal Connaught Hotel, Hamilton, Ont.

A trip through the plant of the host at the meeting, Burlington Steel Co. Ltd., revealed that Canadian methods are surprisingly similar to

American. William Simon, chief counsel of the Capehart Committee, reviewed the Cement case.

Railroads Ask 13% Increase

RAILROADS last week amended their freight rate increase petition before the Interstate Commerce Commission and now are asking for a 13 per cent advance instead of 8 per cent as requested Oct. 1.

The additional increase is to compensate for the 10 cents an hour wage increase recently granted to employees.

The carriers also asked permission to put an 8 per cent freight rate increase into effect immediately. The roads protested the long lags in time between application for rate increases and the effective date of such advances.

The 13 per cent increase just asked would apply to most manufactured commodities.

On coal and coke, the increases of 30 cents per net ton and 34 cents per gross ton asked in the Oct. 1 petition have been upped to 40 and 45 cents.

On iron ore, the carriers now are asking an increase of 35 cents in place of 25 cents asked in the Oct. 1 petition, except on ore shipments to upper lake ports for transshipment by water.

UMW To Seek New Pay Raises

JOHN L. LEWIS' United Mine Workers has launched its campaign for a fourth round of postwar wage increases. When contract negotiations open next spring, the UMW will ask in addition to wage advances: A 35-hour week to replace the standard 40-hour week; time and a half for Saturdays and double time for Sundays, as such; guaranteed daily wage; increase in royalty tax from 20 cents to 30 or 40 cents a ton; increased vacation payments; adjustment in tonnage rates. These moves were approved by the union membership at its 40th biennial meeting in Cincinnati last week.

The miners also voted to double the salary of Mr. Lewis, from $25,000 to $50,000 annually.

Initiation fees were raised from $10 to $50 and monthly dues from $2 to $4. Dues increases will raise union revenues by $12 million annually.

Prices Set for German Scrap

PRICES at which the joint export-import agency for the Anglo-American zone of Germany will make 500,000 tons of German iron and steel scrap available immediately for American buyers have been set.

Per long ton f.a.s. they are: $28.50 for No. 1 heavy melting steel and $52.50 for cupola cast iron.

Appropriate freight differentials will be applied to the prices for benefit of those buyers using inland Rhine river ports.

Charter and bylaws for the proposed corporation to bring German scrap to the United States are to be drawn up by a seven-man task group which was named after the Scrap Industry Advisory Committee recently gave unanimous approval to formation of the corporation.

Appointed to the group are Darwin Luntz, Luntz Iron & Steel Co., Canton, O.; R. V. Bonomo, Schiavone-Bonomo Corp., Jersey City, N. J.; Hiram Winternitz, Charles Dreifus Co., Philadelphia; H. T. Luria, Luria Steel & Trading Corp., New York; Ralph Ablon, Luria Bros. & Co. Inc., Philadelphia; Samuel Keywell, Samuel Keywell Co. Inc., Detroit; and Stanley Kaplan, M. S. Kaplan Co., Chicago.

Charter and bylaws drawn up by the group will be referred to the entire Scrap Industry Advisory Committee, and if they are acceptable to the full committee a public hearing will be held.

Secretary of Commerce Charles Sawyer emphasized to the advisory committee that formation of the purchasing corporation would entail no delay in shipments of scrap already contracted for in Germany.

N. R. PATTERSON

American Institute of Steel Construction has elected as its new president Mr. Patterson, president of Patterson Steel Co., Tulsa, Okla. Other officers elected by the institute at its 26th annual meeting in Quebec (STEEL, Oct. 11, p. 69) include: R. D. Wood, Chicago, first vice president; J. Phillip Murray, San Francisco, second vice president; John E. Jackson, Pittsburgh, treasurer; L. Abbett Post, executive vice president; and M. Harvey Smedley, secretary

WAA Makes Proposal

Suggests Republic let foundries have all of Alabama furnace's iron output

WAR ASSETS Administrator Jess Larson last week urged Republic Steel Corp., Cleveland, to make the output of the government's restored blast furnace at Gadsden, Ala., available to the foundry industry.

Mr. Larson said he was making the suggestion in the interests of foundries which Republic reported would be deprived of merchant iron through the recent lease to Kaiser-Frazer Corp. of a government-owned blast furnace located at Cleveland and now operated by Republic. Productive capacity of the Gadsden furnace is 280,000 tons, which Mr. Larson said is approximately equivalent to the needs of those foundry customers.

In view of some structural difficulties with the Gadsden furnace and to protect the foundry industry Mr. Larson proposed a concession to Republic in the leasing terms.

The Gadsden stack broke down in July, 1947, and was placed back into operation in August, 1948.

Aluminum Marks Sixtieth Year

WITH one of the industry's founders on hand to demonstrate how he poured the first aluminum ingot in 1888, the aluminum industry celebrated its 60th anniversary Oct. 14 in Pittsburgh.

Henry Oliver Evans, president of the Historical Society of Western Pennsylvania, served as master of ceremonies and keynoted the program.

Arthur V. Davis, chairman of the board of Aluminum Co. of America, re-enacted the scene of 60 years ago when he poured an aluminum ingot.

The Aluminum Association conducted its fall meeting sessions in Pittsburgh last week.

To Head Follansbee Steel

M. A. FOLLANSBEE has been elected president of Follansbee Steel Corp., Pittsburgh, succeeding the late Lauson Stone who served in the dual capacity of president and chairman of the company's board of directors. Mr. Follansbee, a director of the company, recently had become executive vice president.

Named board chairman is C. E. Christman, president and general manager of Federal Enameling & Stamping Co., a Follansbee subsidiary.

Windows of Washington

By E. C. KREUTZBERG — *Washington Editor, STEEL*

Paul Hoffman, top management man who heads ECA, sends labor men abroad to convince pro-labor governments U. S. aid is not capitalist plot to control European economy

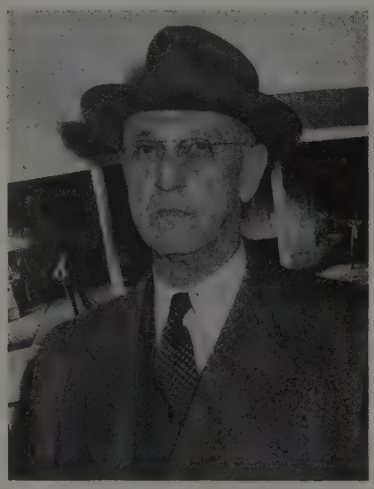
WHILE it is common knowledge that labor union leaders, ever since President Roosevelt moved into the White House in 1933, have become powerful figures in national affairs, it is not so generally known that they have achieved a new distinction.

In this year of 1948 labor leaders for the first time have been enlisted in the country's diplomatic service. None yet has been seen in the traditional cutaway coat and striped trousers, but many in the capital think the day is not far distant when full-fledged ambassadors to at least some foreign countries will be chosen from their ranks.

Strangely enough, this new development springs from a capitalist, a manufacturer, a representative of top management in the American free enterprise system. Namely, Paul G. Hoffman, former head of the Studebaker Corp. and now the brass hat in charge of the Economic Cooperation Administration. When Mr. Hoffman took on this assignment last April he feared that much of the $5 billion a year we proposed to contribute to the upbuilding of Europe would be money thrown down the drain unless we could checkmate the Communists' propaganda that the Marshall Plan was a diabolic Wall Street plot to gain control of the European economy and enslave European workers.

Mr. Hoffman found that, with two exceptions, the governments of the countries participating directly or indirectly in the European Reconstruction Program were labor or socialistic in complexion, or something in between. He also found that in many of them the Communists had penetrated deeply both into the governments and into the labor unions. We have got to talk to those people in terms they will understand, concluded Mr. Hoffman; who, he asked, could do the job better than well-chosen labor leaders, particularly labor leaders who had been abroad and had developed friendships with European labor?

Labor Men Drafted—So in July Mr. Hoffman called in two labor men and drafted them into his top advisory staff. They are Clinton S. Golden, former international vice president of the United Steelworkers —CIO, and Bert M. Jewell, former president of the Railway Employees Department of the AFL. He asked them to develop ways and means of getting the truth about the Marshall Plan to European labor, to convince Europe's labor that it was a wholehearted American effort, backed by American labor, to get Europe back on its feet and, especially, help European countries to retain or regain their freedoms without outside dictation or interference.



CLINTON S. GOLDEN

Now, in October, Mr. Golden told STEEL, this approach has worked out with gratifying success. "Not only has American labor been able to convince European labor that the Marshall Plan is an honest and sincere endeavor backed by American labor, but labor's part in this program has strengthened the morale of the non-Communists in the ranks of labor abroad. There is a great symbolic and psychological value in having American labor representatives in contact with European labor. They know American labor is not working to exploit them."

Under Messrs. Golden and Jewell is M. H. Hedges, for 25 years editor of the journal of the Brotherhood of Electrical Workers — AFL. Mr. Hedges' job is to send labor information from this country to Paris, from which center it is distributed to the American missions in the Marshall Plan countries. The dominating note always is that American labor is back of the program 100 per cent.

Keeps Washington Advised—In Paris, the top labor portfolio under W. Averell Harriman is held by Boris Shishkin, formerly head of the economics research division of the American Federation of Labor. It is Mr. Shishkin's job to advise Mr. Harriman on labor policies and labor angles affecting execution of the Marshall Plan. Under him is a specialist on labor information—Harry Martin, former president of the Newspaper Guild—CIO. Mr. Martin serves in a double-barrelled capacity. He receives and puts to use the labor information sent from Washington; he also reports to Washington on European labor developments which the ECA should know about.

In addition to the labor men in the Washington and Paris offices of ECA, each country mission appointed by the ECA includes one or more labor representatives whose duty it is to contact labor leaders in the countries and make sure that they have a correct understanding of the American viewpoint as to the Marshall Plan.

To a large extent, Mr. Hoffman's thinking was influenced by the experience gained by Mr. Golden in Greece in 1946 as a result of President Truman's request that he make it clear to the Greek labor leaders that in aiding Greece against the Communists we were actuated simply by the purpose of helping the Greek people to retain their freedom. Mr. Golden says that this worked out very satisfactorily in relieving the Greek labor leaders of fears and misapprehensions over what the Americans had in mind.

The more Mr. Hoffman observes the functioning of this setup the better he likes it. This is best attested by frequent announcements of the appointment of more labor men to staff jobs with ECA. One of the latest appointments, for example, is that of David J. Saposs as special adviser to Boris Shishkin in Paris. Mr. Saposs not only is a practical labor executive but has had valuable experience with the Labor Department in Washington where he served as special assistant to the commissioner of labor statistics.

Expects Good Results—Recently, when formation of a joint Anglo-American Council on Productivity was under discussion with the British, Mr. Hoffman sent Messrs. Golden and Jewell to Europe to look into the situation. When they came back,

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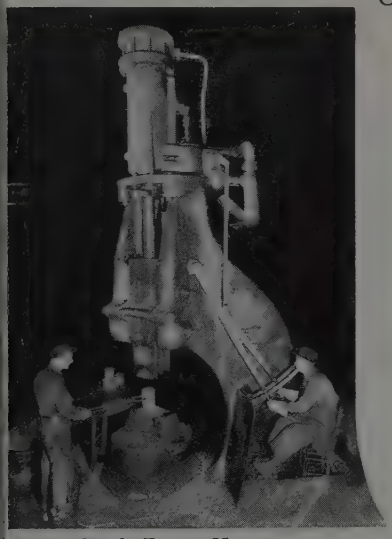
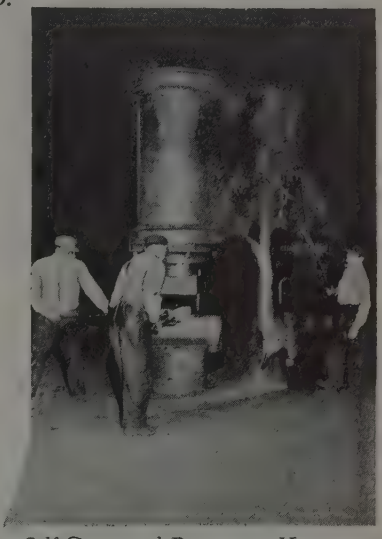
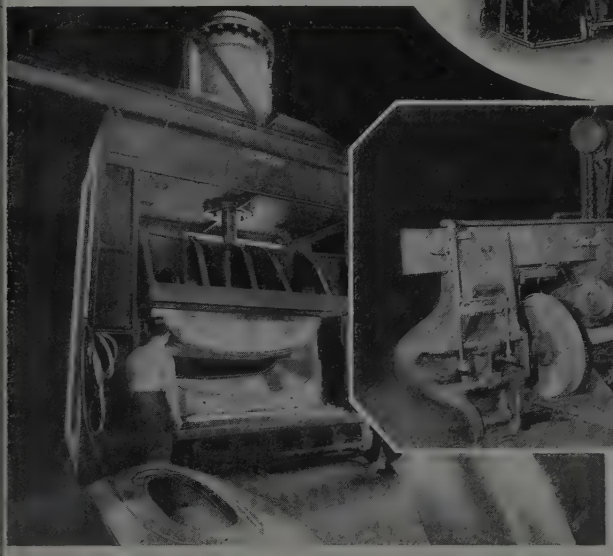


Single Frame Hammer

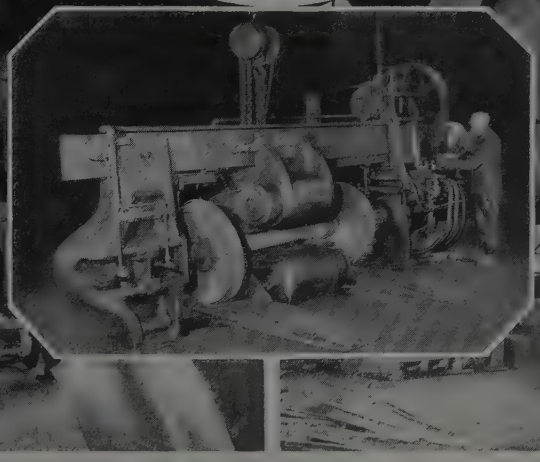
The CECO-DROP



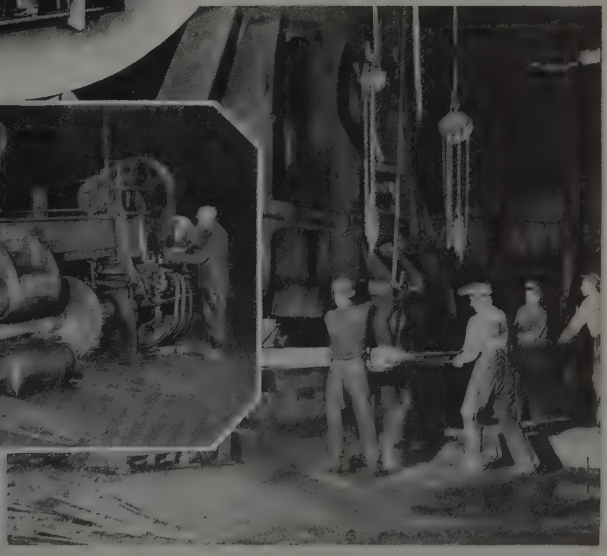
Self-Contained Pneumatic Hammer



Cecostamp



Railway Car Wheel Press



Double Frame Forging Hammer

they reported that increased productivity was the real key to European recovery; Mr. Jewell estimated that the man-hour productivity of the participating European countries could be raised as much as 45 per cent. On the theory that increased productivity cannot be had without the complete co-operation of labor, and that such co-operation can be best obtained by having labor men talk among themselves and teach each other the know-how, he appointed four American labor representatives and four American management representatives to the joint council. He looks for good results. If this endeavor turns out as well as expected, councils on productivity will be organized in other European countries and additional American labor men will be recruited to serve on these councils.

There is a plentiful supply of talent among labor's ranks today, Mr. Golden told STEEL. Mr. Golden, who during the war served as vice chairman of both the War Production Board and the War Manpower Commission, and who left his job as lecturer on labor relations at the Harvard Graduate School of Business Administration to come with ECA, points out that the labor generation of today knows pretty well what makes the wheels go round in the economy.

"And they are eager to learn," he added. "The fact that upwards of 10,000 labor union officers and members took summer courses in applied economics and related subjects at colleges and universities in 1948 proves that they are eager to prepare themselves for real responsibility."

Federal Employees Increase

BEARING OUT predictions in STEEL early this year, the number of civilian employees on federal payrolls has been increasing steadily. This results from needs of departments and agencies created or expanded by Congress—particularly the Economic Cooperation Administration and the armed services. The increase has been 125,178 since Dec. 31, 1947—at the rate of 513 per day. Government civilian personnel at the end of August numbered 2,120,583. Of these, 885,246 were in the armed services, the rest in civilian agencies. Monthly payroll in August was running in excess of $6 billion annually.

Spokesmen for Governor Dewey say that if the latter is elected to the Presidency he definitely will not favor wholesale firings as that would be costly in morale and unfair to loyal employees. Rather, he will encourage a policy of reducing government employment by recommending that employees who leave the government service by death, retirement or to take jobs in private industry be replaced only when it is essential to do so.

To Promote Basic Research

RESIGNATION of Dr. Vannevar Bush from chairmanship of the National Military Establishment's Research and Development Board removes from the national scene the colorful figure who has dominated government activities in the field of scientific research and development since 1940. In that year he became chairman of the National Defense Research Commission, later the Office of Scientific Research Development until in 1947 it was succeeded by the present board. Dr. Bush, then vice president and engineering dean of Massachusetts Institute of Technology, came to Washington in 1939 to become president of the Carnegie Institution. He is resuming that post.

Dr. Karl T. Compton who has left the presidency of MIT to succeed Dr. Bush, for years has rated as one of the nation's top scientists and in World War II was active in the development of atomic warfare, radar, ordnance and synthetic rubber.

In his new post Dr. Compton will probably exert a major influence on shaping the National Science Foundation Act which is expected to be enacted by the 81st Congress. He shares Dr. Bush's belief that direction of the nation's science program should be in hands of scientists for best results, but does not oppose putting the program under a government administrator responsible to the President. Certainly Dr. Compton will exert his full efforts towards stimulating basic scientific research in the United States; he recently deplored the extent to which in the past we have been forced to base our development work on basic European discoveries.

U.S. Science Missions Shrink

WHILE the British and the Dutch maintain live science missions in the United States to glean for their nationals the fruits of United States research and development work, our own program in this direction has fallen to insignificant proportions. This is because of a cut in the State Department's foreign service funds. From a peak of nine scientists and technical experts on our Science Staff in our London embassy, we have only two men left; plans to appoint more are in abeyance until the department decides how it is going to spend its available money.

The matter, it is pointed out in Washington, is one whose importance justifies the bringing of pressure by American industry, particularly their trade and technical organizations, for a lot of valuable information can be obtained through an adequately manned listening post in London. At least two technical organizations have signified interest in having a metallurgical observer added to the Science Staff in London. They are the American Society for Metals and the American Foundrymen's Association. The men still carrying on in London are Dr. Earl A. Evans Jr., biochemist, University of Chicago, and Dean W. R. Woolrich, College of Engineering, University of Texas.

May Defer Science Students

DETERMINATION of policy as to whether student scientists and researchers should be deferred under the Selective Service Act has been referred by President Truman to the National Security Resources Board. There a policy of leniency is expected to be agreed on, if Dr. Leonard Carmichael, director of the NSRB Office of Manpower, has the say.

The President referred to the NSRB two conflicting views. On the one hand, Selective Service System is reported to have proposed deferment for medical, dental, osteopathic and veterinary students only. The Interdepartmental Committee on Research and Development headed by Alexander Wetmore of the Smithsonian Institution, on the other hand, proposes a plan for deferring up to 50,000 students per year in all branches of science, with the less able ones weeded out and losing their deferment status as they fail to maintain a minimum grade.

Steel House Builder Gets Aid

FIRST manufacturer of prefabricated houses to get capital assistance under Public Law 901—the Housing Act of 1948—is Reliance Homes, Lester, Pa., producer of steel homes. Reconstruction Finance Corp. has approved this company's application for a loan of $375,000 to be used as working capital.

At least 12 prefabricators have made application to the Federal Housing Administration, under the same law, for mortgage insurance in order to raise money to defray cost of producing prefabricated housing. Two of these have been processed to the negotiating stage. The applications are for insured mortgages, not only for financing production but also to finance real estate dealers who undertake the sale of the prefabricated houses.

Population Up

Increase of 14 million since 1940 and geographic shifts may explain some industry ills

METALWORKING executives are studying the current population estimates for partial explanations of the continuing maladjustments in industry's distribution system and labor supply.

Increases and shifts in the population account for some of the difficulties with distribution, is the reasoning, and worker migration could be one of the causes for tight labor supply, particularly among the higher skilled categories. As proof for this contention can be cited the fact that United States population since 1940 has increased by 14,444,000 or 11 per cent, according to Bureau of the Census estimates, to 146,114,000, swelling demand for metalworking products by that much.

Population Shifts—In addition to the general increase, population migration is tangling distribution pipelines. Greater demand now comes from California, for example, with a gain of 3,124,000, bringing current totals to 10,031,000. Other states with substantial numerical increases were Michigan, 939,000; New York, 907,000; Ohio, 891,000; and Texas, 815,000. The West showed a 34.4 per cent increase, boosting totals to 18,656,000. North Central states had a 9.2 per cent rise, with 43,846,000 people now living there. Northeastern states, with an increase of 8.7 per cent, now have a population of 39,104,000. The South had the smallest increase, 6.8 per cent, but its population is still the largest of any region, 44,507,000.

Oregon had the largest percentage increase, 49.2 per cent, followed by California, Washington, Arizona, Nevada and Florida. Industry executives see in this information further proof of the fact that many skilled workers migrate to these regions, where a good climate is a greater magnet than job opportunity, because they can get jobs anywhere.

Labor Tight in Chicago—The Chicago area is currently suffering one of the most acute labor shortages, with 4500 additional workers needed for the steel plants alone. Production is maintained only through extensive overtime. Skilled labor in this and other areas is getting worse, the Federal Security Agency reports. Nation's defense program, as well as migration, is causing particular hardships in the aircraft, shipbuilding and textile fields.

The draft is not expected to have severe effects on skilled labor, in spite of the fact that 4 per cent of the working male population is eligible. Most skilled workers would be over the draft age limit, and in addition, Secretary of Defense James Forrestal has announced a system of occupational deferments designed to keep essential labor in industry.

THREADLESS FITTINGS: A new arena floor for Madison Square Garden recently was laid in four weeks, a speed attributed to the use of threadless pipe fittings to connect 13 miles of concealed refrigeration piping. Three thousand black malleable couplings, made by Stanley G. Flagg Co. Inc., Philadelphia, were employed to connect 20 and 40 foot lengths of galvanized wrought iron pipe by silver brazing. Photo shows joining of sections on the site

Steel Payrolls, Wages Up

PAYROLLS and average hourly earnings in the steel industry set new records in August, according to the American Iron & Steel Institute. Average hourly wage in August was $1.689, an increase of 4.4 cents over July and 13.3 cents over August 1947.

Payroll for the entire industry was estimated at $193,800,000 in August, up 14.6 per cent from July. Employment also set a postwar record, averaging 644,500 in August.

For the first eight months of 1948 steel pay rolls aggregated $1,427,705,000, compared with $1,290,883,000 for the corresponding period last year.

Seeks Help for Small Business

AMENDMENT of the Internal Revenue Code to provide exemption from taxation of $25,000 of undistributed earnings is sought by the Commerce Department's Small Business Advisory Committee.

Other tax law changes recommended by the committee at a meeting in Washington recently are elimination or reduction of the present duplication of taxation on dividends paid out, and permitting of businessmen to fix their own depreciation schedules, based on cost.

Resolutions by the committee also call attention to desirability of reintroduction and passage of the Tobey bill to permit the Federal Reserve System, in certain circumstances, to guarantee up to 90 per cent of commercial loans made by its member banks; urge continuation of the Office of Technical Services' dissemination of technical information, with

special attention to needs of small business; and recommend early taking and publication of a census of business.

F.O.B. for All Industry?

Chicago Association of Commerce, in assisting Capehart Committee, seeks answer

WHAT EFFECT would complete discontinuance of freight absorption have on industry? That's a question at the nub of the Capehart subcommittee's current inquiries into pricing policies. To help the committee and its advisory council arrive at the answer insofar as the Chicago region is concerned, Chicago Association of Commerce & Industry last week mailed out more than 3400 questionnaires to members engaged in manufacturing, distribution and transportation, asking for data relative to delivered prices and freight absorption.

Questions asked are these:

"If you are primarily a manufacturer, was it your practice during 1947 to sell all of your products at a uniform price at the point of their manufacture?

"If not, approximately what percentage of your 1947 sales was made in each of the following ways: (a) At delivered prices uniform to all buyers in specified zones? (b) At delivered prices uniform to all buyers throughout the nation? (c) At delivered prices, in which you absorbed part or all of the freight when you believed it necessary to meet prices of a competitor?

"If you are primarily a distributor, did you, during 1947, sell all of your products f.o.b. your plant?

"If you are primarily a distributor, did you, during 1947, equalize freight with competitors in other distributing centers, on part or all of your merchandise?

"Whatever the character of your business, have you changed your methods of pricing as a result of the Supreme Court decision in the cement case?

"How would the discontinuance of freight absorption affect your company?

"Do you believe the discontinuance of freight absorption would force companies in your industry to change the location of their plants?

"Do you think mandatory uniform plant prices would increase or decrease competition (a) within your industry? (b) in business generally?

"Do you favor legislation clearly permitting: (a) Sales at delivered prices uniform to all buyers in specified zones? (b) Sales at delivered prices uniform to all buyers throughout the nation? (c) Sales at delivered prices, in which the seller absorbs part or all of the freight when he believes it necessary to meet competitive prices?"

Survey Equipment Policies

EQUIPMENT replacement and depreciation policies of capital equipment manufacturers recently were surveyed by Machinery & Allied Products Institute, Washington, and the information has been assembled into a book entitled "Dynamic Equipment Policy" to be released soon.

Replies to questionnaires indicate a considerable degree of backwardness both in organization and in practice of an equipment policy. According to the survey, scarcely more than one quarter of the equipment manufacturers have an engineer who specializes in replacement studies and their customers are little, if any, better in this respect.

Another general weakness indicated is that plant operating executives originate recommendations for re-equipment while the final decision rests usually with the general officers.

Further support was given to a widely held impression when the questionnaire showed that lack of capital is an important contributing factor to backward and irregular mechanization.

Reflecting in part the tendency to standardize depreciation rates for tax purposes, 80 per cent of the companies responding show average building depreciation rates between 2 and 3 per cent inclusive. For equipment, 74 per cent report averages falling between 5 and 8 per cent inclusive. If the companies had full discretion to name their own depreciation rate, 87 per cent would take rates of 5 per cent or under for buildings and 73 per cent would take rates of 10 per cent or less for equipment.

Capital Funds Needed

EQUITY capital funds are urgently needed by the steel industry because it will be impossible to continue financing improvements out of earnings, said Charles R. Hook, board chairman, Armco Steel Corp., Middletown, O., speaking at a recent meeting of Customers' Brokers in New York.

Fall in popularity of sound equities with the investing public and the fact that legal rates of depreciation allowed on plant and equipment now barely cover 50 per cent of replacement costs make the situation currently acute, Mr. Hook said. He declared that on the basis of current prices, depreciation costs allowed should be double the present day rates.

Westinghouse Slates Meeting

SECOND Materials Handling Conference sponsored by Westinghouse will be held in Buffalo Nov. 8-9. First day's session will convene in Hotel Statler; the second day's at the Westinghouse Buffalo plant.

Calendar of Meetings . . .

Oct. 18-22, American Institute of Electrical Engineers: Midwest general meeting, Milwaukee. Institute headquarters are at 33 W. 39th St., New York.

Oct. 18-22, Wire Association: 1948 annual convention, William Penn Hotel, Pittsburgh. Association headquarters are at 300 Main St., Stamford, Conn.

Oct. 18-22, National Safety Council: 36th national safety congress and exposition, at Hotels Stevens, Sherman, Morrison, Congress and LaSalle, Chicago. Council headquarters are at 20 N. Wacker Dr., Chicago.

Oct. 20-21, National Conference on Industrial Hydraulics: Fourth annual meeting at Hotel Sheraton, Chicago. Conference is sponsored by Illinois Institute of Technology.

Oct. 21, American Iron & Steel Institute: Regional technical meeting, The Copley Plaza, Boston.

Oct. 21-22, Society of Automotive Engineers: Production meeting and clinic, Statler Hotel, Cleveland.

Oct. 25-27, American Gear Manufacturers Association: Fall meeting, Edgewater Beach Hotel, Chicago. Association headquarters are in the Empire Bldg., Pittsburgh.

Oct. 25-29, American Society for Metals: 30th annual meeting, congress and exposition at Commercial Museum and Convention Halls, Philadelphia. Society headquarters are at 7301 Euclid Ave., Cleveland. The following associations will hold technical meetings in conjunction with the congress: **American Welding Society, Institute of Metals Division of American Institute of Mining & Metallurgical Engineers and Society for Non-Destructive Testing.**

Oct. 26-27, American Management Association: Annual meeting of Office Management Division, at Hotel Pennsylvania, New York. Association headquarters are at 330 W. 42nd St., New York.

Oct. 26-28, Purchasing Agents Association of Baltimore: Eighth annual manufacturers' products exhibit, at Lord Baltimore Hotel, Baltimore.

Oct. 27, American Iron & Steel Institute: Regional technical meeting, Hotel Thomas Jefferson, Birmingham.

Nov. 3-5, American Institute of Electrical Engineers: Southern district meeting, Birmingham. Institute headquarters are at 33 W. 39th St., New York.

Nov. 3-5, American Society of Body Engineers Inc.: Annual convention, Rackham Memorial Bldg., Detroit. Society headquarters are at 100 Farnsworth Ave., Detroit.

Nov. 4-5, Society of Automotive Engineers: Fuels and lubricants, The Mayo, Tulsa, Okla. Society headquarters are at 29 W. 39th St., New York.

Nov. 14-17, National Tool & Die Manufacturers Association: Annual meeting, Hotel Schroeder, Milwaukee. Association headquarters are at 1412 Union Commerce Bldg., Cleveland.

French Industry Revival

ECA earmarks $150 million to be used in equipment programs and fleet reconstruction

DETAILED plans to increase France's productive capacity with the use of 45 billion francs of the French counterpart fund have been announced by Paul G. Hoffman, ECA administrator.

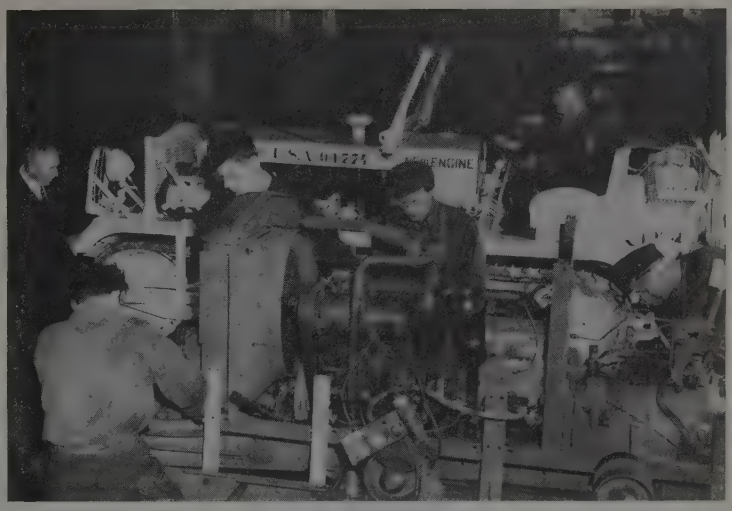
Of the 45 billion francs (about $150 million), 40 billion will be used for equipment programs of basic industries and 5 billion for reconstruction of the merchant and fishing fleet. About 24,900,000,000 francs of the 40 billion will go for more power output. The power program allots 17 billion to Electricite de France, a government public utility, for further construction of 60 hydraulic plants and 11 thermal plants with a corresponding yearly capacity of 7 billion kwh of hydroelectricity and an installed thermal power of 750,000 kw. All the thermal plants and 53 hydraulic units are expected to be in operation in 1952 and will raise France's electric power to 40 billion kwh at that time, as against 26.3 billion in 1947.

Rhone River Development—Compagnie Nationale du Rhone is using 4 billion francs to handle the hydraulic equipment program on the Rhone river. Projects under construction are: The Genissiat, Seyssel and Donzere-Montdragon dams; various hydraulic installations, particularly the Port Edouard Herriot in Lyon. The first two dams are nearly completed and will have a combined annual capacity of 3380 million kwh. The first part of the Donzere dam will be completed by 1952. Almost 4 billion francs will be used for power plants at mines in the Nord and Pas de Calais districts. Total power generated will be 265,000 kw.

In these same districts, 8,300,000,000 francs will be earmarked for expanding coal production. Of this sum, approximately 1 billion will be used for continuing construction of coking plant installations. Under construction are 15 batteries with a total charging capacity of 12,000 tons per day. The remainder of the coal funds, 7,230,000,000 francs, is to be used for continued modernization, extraction and mechanical preparation of coal.

Expand Farm Output—As one way to boost agricultural production, France is striving to increase use of fertilizers, particularly nitrates, with the goal of pushing consumption from 170,000 tons a year at present to 350,000 tons by 1952. About 300 million francs will be used to continue construction on two nitrate plants at Mazingarbe and one at Carling.

Railroads, the fourth basic industry to be benefited, will get 6,465,000,000 francs for modernization and rehabilitation.



REBUILD TRACTORS IN GERMANY: Skilled German workers completely rebuild American tractors for operation on American airfields in the occupied zone in an automotive rebuilding plant operated by the United States Air Forces in Europe at Weinheim. Operation saves hundreds of thousands of dollars as tractors, wreckers, semitrailer plane refueling tractors and other vehicles are made "like new" at a cost of a few hundred dollars. German mechanics are paid wages, but value more the food and clothes that their jobs enable them to obtain

ECA Starts Trial Run for China

EUROPEAN Cooperation Administration has initiated a trial run of its newly developed procedures for administering the $70 million reconstruction and replacement program in China.

Four projects, totaling $4,400,000, have been selected to try out procedures which have been set up exclusively for China because of the instability in that country. Each project has selected a project engineer, in the form of an American or European engineering firm. For example, Yangtze Power Co., Nanking, one of the "applicants," has chosen Anderson, Meyer & Co. as its project engineer. This firm must work up details of the needs, procure the materials and supervise their installation. American firms wishing to participate in the Chinese program must contact and submit bids to the project engineer. The Yangtze project has been allotted $1,200,000.

The three other projects, with the applicant, project engineer and amount listed in that order; are as follows: Kailan Mining Administration, Jardine Engineering Co., $1 million; Tientsin Peiping Power System, William Hunt & Co., $1,200,000; and Taiwan Sugar Co., General American Transportation Co., $1 million.

Bizonia Mends Economic Ties

FIRST painful steps were taken recently by Western Germany in moves toward closer economic ties with other West European nations.

First action was the establishment of a Belgium-Luxemburg-German Chamber of Commerce in Cologne with leading steel interests from these countries participating. Second move was preliminary meetings between Dutch and German industrialists regarding formation of a Dutch-German Investment Bank in the Ruhr, to be backed primarily by capital from the Netherlands.

Balancing this has come a final "no" from the Economic Council on a price boost in steel. Hardest hit by this decision will be the 30 new steel firms who have been producing at heavy losses despite public subsidizing. In making this ruling, the council also granted a boost in farm prices and gave the go-ahead signal to the trade unions to campaign for higher wages. In the face of all this, observers feel that the new steel firms will have to go back to the parent organizations or face a complete economic disintegration.

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By A. H. ALLEN *Detroit Editor, STEEL*

Mirrors of Motordom

Willys-Overland holds tooling costs for 10 different models to $8.2 million, has room to spare for additional models without further tooling expense

DETROIT

HOW to tool a line of ten different models of utility vehicles in the passenger car and truck field for a mere $8.2 million and still have room to spare for additional models without further tooling has been demonstrated by Willys-Overland Motors over the past three years. Since June, 1945, and through Sept. 30 this year, approximately 300,000 units have come off the company's assembly lines. This, plus the fact the company is earning the highest dollar profits in 20 years, attests to the ingenuity of engineers and administrative officials in mapping out and carrying through the overall program.

These facts were highlighted at the third annual W-O institutional day in Toledo, Oct. 6, when three new models—a 4-wheel drive station wagon, a 6-cylinder station wagon and a so-called utility wagon—were unveiled. Seven other models which have been in production for some time include the Jeep, the 4-cylinder station wagon, a panel delivery truck, a 2-wheel drive truck, a 4-wheel drive truck, a station sedan and the sports jeepster.

An ace-in-the-hole which the company has been holding close to its vest for the past three years is a light-weight passenger car on which no tooling, except for the chassis which is used on other vehicles, has been started. A mock-up of the car is in process of continual modification while company officials study the market to see if there is an "economic vacuum" which the model might fill.

Seeks Full Use of Plant—As expressed by James D. Mooney, president, the principal job of recent years has been "getting the plant full' of production so that maximum use might be made of facilities. At the moment, despite full backlogs in the hands of all distributors and a year of production which realized profit of $6 million, he is none too sanguine over the economic outlook. He regards it as dangerous to presume things are going to continue much longer as they have in the postwar period up to now. The spree may be nearing its end, and it may be a good thing for it will mean a resumption of competitive selling, and could result in a considerable freeing up of materials.

Need More Steel—Like most other manufacturers, Willys production officials are literally screaming for more steel. The company, according to Mooney, is receiving monthly about twice the tonnage of steel which was being shipped a year ago, but it is still not enough. In addition to unsatisfied in-plant requirements, Willys must furnish flat-rolled steel to Briggs in Detroit, builder of station wagon bodies.

The beauty of the W-O position is that 20 per cent of its production is gobbled up by export markets, and there is no real competition for its type of vehicles in the domestic market. Naturally, this was a definite part of the company's planning; it wanted no part of a direct fight with the big three, although the question might logically be asked—if the buyer of a jeepster, for instance, could get immediate delivery on a Ford or a Plymouth or a Chevrolet, would he still buy the jeepster. In that area, Willys still may have its selling job cut out for future months. Meanwhile, the company is maneuvering its various models on the production checkerboard with a maximum of speed and a minimum of cost.

Mr. Mooney would like to see what he calls a sensible return to some basic concepts in automotive design, and he is not alone in this position. Many feel that motor car manufacturers are sacrificing far too much in the way of safety and utility in their constant striving for beauty of line. After all, can you argue with the contention that the automobile hood should serve only its original function—to cover the engine?

Willys is pushing toward an annual goal of 300,000 vehicles. This year it will build about 135,000, last year the total was 120,042. Peak year in the company's 46-year history was in 1928 when output touched 314,000. In the 4⅓ years prior to Aug. 20, 1945, some 361,349 military jeeps were furnished the armed services.

Automobile Production

Passenger Cars and Trucks—U. S. and Canada

	1948	1947
January	422,236	366,205
February	399,471	393,663
March	519,154	443,588
April	462,323	445,137
May	359,996	404,191
June	454,401	421,466
July	489,736	399,456
August	478,168	364,478
September	432,000*	444,501
9 mos.	4,025,000*	3,682,685
October		461,536
November		417,493
December		492,109
12 mos.		5,055,284

* Preliminary.

Estimate for week ended:

	1948	1947
Sept. 25	98,394	106,894
Oct. 2	121,475	101,608
Oct. 9	119,490	98,978
Oct. 16	118,000	89,100

Estimates by Ward's Automotive Reports

Kaiser Still Has Supply Problems

WHEN not engaged too busily in beaming over 1949 Kaiser and Frazer models, the latter introduced formally this week, Edgar F. Kaiser, vice president and general manager of K-F, casts a critical eye on his steel supply problems, and what he finds is not too encouraging. Current production is about 800 cars a day, connoting monthly steel requirements of 35,000 to 40,000 tons, against allocations of only 1500 tons or less than 5 per cent. The remainder has to come from some fast and furious trading. Blast furnaces at Struthers, O., and Provo, Utah, bring 40,000 tons of pig iron a month into the market, but it takes an average of two tons of pig for every ton of finished steel K-F is able to obtain on conversion contracts. Therefore, the pig iron brings in only around 20,000 tons of steel, leaving a deficiency on an 800-car daily production schedule of 15,000-20,000 tons. Additional help of course is being received from the 5000 tons of basic iron K-F now is entitled to buy from the Republic-operated blast furnace in Cleveland,

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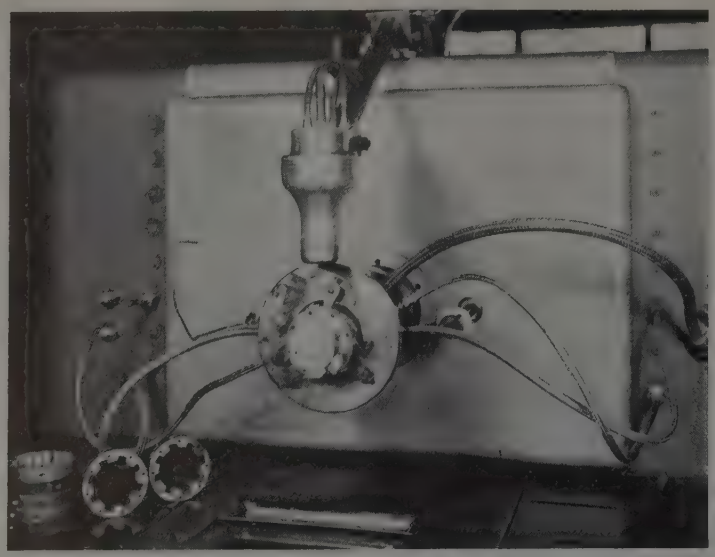


NEW BUICK TRANSMISSION: At the Metal Show in Philadelphia next week, Cincinnati Milling Machine Co. will show how a difficult heat treating job is performed with its Flamatic machine. Hardened area must be confined to the eight internal lobes of overriding clutch cams for Buick's Dynaflow transmission which will be available shortly on the Super, as well as the Roadmaster models. Production, automatically controlled, has been boosted to 187 cams per hour with no scrap loss and negligible distortion

and doubtless some of Kaiser's steel production at Fontana, Calif., can be manipulated in some way to produce more steel for Willow Run.

The new Frazers carry considerably more bright metal trim than did their predecessors and also embody many of the improvements in body and chassis announced earlier in the Kaiser lines. Body side panels are deeper and curve inward, with a wide chrome trim along the base, plus a new crease molding strip extending the length of the car below the window openings. Engine, with 7.3:1 compression ratio, carries the same 12 per cent boost in horsepower as in the Kaiser, effected by dual-throat carburetion and dual manifolding. Some 57 varieties of body color and fabric combinations will be available, although the only body type produced is the four-door sedan. Convertibles will be on the market later in the fall.

Import British-Built Fords

DEALER orders for English-built Ford passenger cars—the Anglia 2-door sedan and the Prefect 4-door type—have more than doubled the number originally anticipated for receipt this year. Plans called for bringing in 6000 during 1948, but dealer orders now cover better than 12,000. Two thousand have been delivered to buyers, mostly on the Atlantic Coast. First plans called for distribution only in Boston, New York, Philadelphia, Washington and Wilmington, Del. However, more dealers sought franchises, and they are now being retailed on the Gulf Coast and Pacific Coast, as well as in Pittsburgh, Cleveland, Detroit, Cincinnati, Minneapolis, Chicago and Memphis. In addition to the two passenger cars, there is available a light panel truck, known as the Thames Van. All three are powered by a 4-cylinder 30-horsepower engine capable of delivering speeds up to 63 mph.

Ferguson Tractors in Production

LAST Monday, Harry Ferguson, Irish-born inventor of the Ferguson system of tractor and hydraulically controlled implements, drove the first tractor off the assembly line of his new plant in Detroit. The unit closely patterns the Ford tractor, in which Ferguson at one time was interested, and it is planned to move production to 100 units daily within 60 days, and to 500 a day as rapidly as possible with two-shift operations. Much will depend upon the ability of suppliers to deliver parts and subassemblies. Engine is a Continental 4-cylinder type. Radiators and ignition equipment are furnished by General Motors subsidiaries, clutch and transmission by Borg-Warner. The 170,000 square foot Ferguson plant was completed July 26, just 116 days after ground was broken, and in the past three months equipment installation has been rushed to get assemblies started this month.

New Buicks Unveiled

FIRST showing of the 1949 Buick models will be made Monday, Oct. 18, to the press at the Flint plant. Reportedly they will include only two series of models, the series 50 and 60, both of which will have the dynaflow transmission as optional equipment. The smaller 40 series apparently has been discontinued for the present. Basic body shell will be approximately that of the present Cadillac and Olds futuramic. First showing of the 1949 Cadillac line, incidentally, with a new V-8 valve-in-head engine, will be held Friday of this week.

Dodge Shows Light Trucks

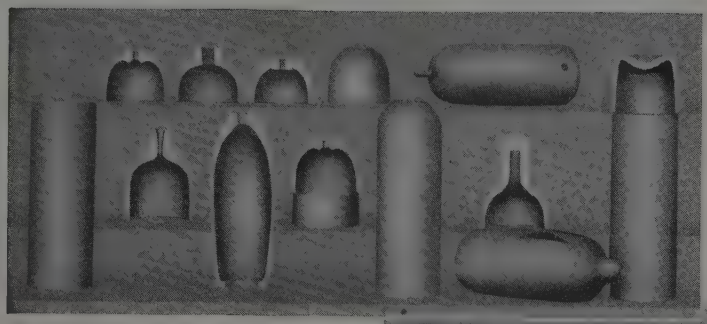
ALSO on Oct. 18 Dodge will unveil a new line of "Route Vans," special types of vehicles for light hauling of the door-to-door type. They are said to include a number of innovations which thus far have been restricted to passenger cars.

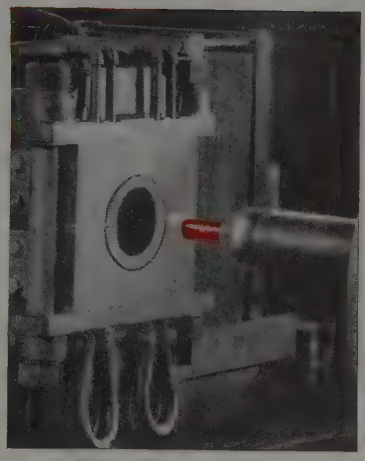
Standardization Needed

THE motor car and petroleum industries probably will face a standardization program in supplying proper fluids for automatic transmissions, fluid couplings and torque converters, if past experience in the lubricant field is any indication. H. F. Wolf, assistant to the technical director of General Motors research laboratories, has observed that transmission fluids are designed specifically for each model of transmission, just as gears, pistons, crankshafts and other integral parts are designed, and if every transmission will need its own type of fluid there may be hopeless confusion in the field, and failures from use of improper fluids.

Early in GM's experience with semi-automatic transmissions it was demonstrated conclusively that the success of a fully automatic transmission would depend upon a fluid which functioned as a hydraulic power transmission medium, a hydraulic control fluid, a heat transfer medium, a clutch fluid and a gear and bearing lubricant. Inferior products may prevent proper functioning of control mechanisms. The job of standardization on transmission fluids could well be a high-ranking one for SAE.

Federal announces "THE WESTIN PROCESS"





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The Westin Process is one more example of how Federal is making every effort to reduce costs and increase production and quality in the metal working field.

When forming tubular sections, it will pay to look into the Westin Process. The illustrations on this page are intended only to set you to thinking about your own production. It costs nothing to inquire.

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Carpenter Expansion

Steel firm spends $1,071,000 on improvements during the 1948 fiscal year

CARPENTER Steel Co., Reading, Pa., spent $1,071,000 on improvements and replacements during the fiscal year ended June 30, 1948, according to the firm's recently released annual report.

Carpenter still has commitments for new construction totaling $210,000. Major units in the postwar construction program have been a new metallurgical laboratory and new facilities for its Alloy Tube Division at Union, N. J.

The company anticipates increased sales of its recently introduced Carpenter Stainless No. 20, a corrosion-resistant steel produced in malleable form. Duriron Co., Dayton, O., which licenses Carpenter on this product, produces the item in cast form only. Carpenter expects to continue its good rate of operations on all products for at least the next six months.

Net sales for the fiscal year amounted to $22,433,568, a 6.4 per cent decrease from the 1947 fiscal year. Rising costs cut the net income to $1,553,783, a drop of 32.4 per cent from the previous year.

INTERNATIONAL NICKEL DIRECTORS: Seventeen directors of the International Nickel Co. of Canada Ltd. from the United States, Canada and Great Britain inspected the company's mines in Ontario recently

Left to right, front row: H. R. MacMillan, Vancouver, president, H. R. MacMillan Export Co., Ltd.; Viscount Weir of Eastwood, Glasgow, Scotland, chairman, G. & J. Weir, Ltd.; Reg Halladay, Cresskill, N. J., Halladay & Co.; Robert C. Stanley, Dongan Hills, N. Y., chairman of the board and president; Dr. John F. Thompson, New Canaan, Conn., executive vice president; and James S. Duncan, Toronto, president, Massey-Harris Co., Ltd. Second row: R. Leslie Beattie, Copper Cliff, vice president and general manager in charge of Canadian operations; Ross H. McMaster, Montreal, chairman, the Steel Co. of Canada, Ltd.; John P. Bickell, Toronto, chairman, McIntyre-Porcupine Mines, Ltd.; Laurance S. Rockefeller, New York, president of Rockefeller Brothers Inc.; Sir William T. Griffiths, London, Eng., vice president in charge of operations in Great Britain and European activities; and Dr. Donald Hamilton McLaughlin, Berkeley, Calif., president, Homestake Mining Co. Third row: Viscount Margesson of Rugby, London, Eng.; H. C. F. Mockridge, Toronto, Canadian counsel; William J. Hutchinson, Peapack, N. J., treasurer; Henry S. Wingate, New York, secretary; and Grant B. Shipley, Pittsburgh, chairman, Elliott Co.

Georgians Visit Gary Steel Units

DEMONSTRATING the interdependence of agriculture, small business and big business to 148 business and professional men from Georgia was one of the aims of an inspection trip through the world's two largest steel plants, the steelworks and the sheet and tin mill of Carnegie-Illinois Steel Corp. at Gary, Ind., recently.

The visitors were guests of Cason J. Callaway, a director of U. S. Steel Corp., who awarded a tour of points of interest in the East and Midwest to the group for their success in the project originated by Mr. Callaway known as the Hundred Georgia Better Farms Program.

Speakers at a luncheon given for the Georgians at Gary emphasized the close relationship existing between farmers and steel producers. Frank Reynolds, manager, agricultural extension bureau of Carnegie-Illinois, explained that in the neighborhood of two million tons of the company's products annually go into farm machinery, buildings, etc.

Kennametal Adds Space

SECOND extension of plant facilities made within one year at Kennametal Inc., Latrobe, Pa., is a program involving the expenditure of $200,000 for erection of a building at the rear of the company property and an addition to its laboratory. Both structures will be of steel and brick construction and will be ready for occupancy early in December.

New plant building will provide 6000 sq ft of additional floor space for the Carbide Division. It will have modern means of air conditioning and control of dust, moisture and temperature, assuring satisfactory processing of Kennametal ingredients. The laboratory extension will include an additional 1600 sq ft of floor space.

National Lead Buys Titanium Firm

NATIONAL Lead Co., New York, has acquired the business of Titanium Alloy Mfg. Co. Transaction includes acquisition of Titanium's head offices in New York and its plant at Niagara Falls, N. Y., which will be operated as a division of National Lead.

The Niagara Falls plant produces compounds of zirconium for use in the ceramics industry and alloys of titanium for use in the ferrous and nonferrous metal fields. The company also has developed a field for the use of titanites in radio, radar and television.

Alloy Steels Formed in Detroit

ALLOY Steels Inc., 7055 Intervale, Detroit, has been organized to warehouse alloy and special steels in the Detroit area. Initial operations will be confined to the tool steel field. President and treasurer is James D. McKnight, former Detroit district sales manager for Allegheny Ludlum Steel Co., and associated with that company for 13 years. Principal stockholder in the new company is Donald B. McLouth, president of McLouth Steel Corp., Detroit. Two modern warehouse buildings, involving investment of around $220,000, are now occupied.

Grant Mexican Steel Loan

EXPORT-IMPORT Bank has announced authorization of a credit of $1,500,000 in favor of Nacional Financiera S. A., a financial agency of the Mexican government, to enable it to provide financing required by La Consolidada S. A., a Mexican steel company. The credit, which will be guaranteed by the United Mexican States, will be amortized over a term of five years.

La Consolidada is one of three major producers in the Mexican steel industry whose operations are conducted on an integrated basis. Recently the company expanded its operations by the installation of a new rolling mill outside Mexico City and an additional open-hearth furnace at Piedras Negras in northern Mexico to better serve the growing needs of an increasingly industrialized Mexican economy.

Briefs . . . .

Paragraph mentions of developments of interest and significance within the metalworking industry

Irving Varnish & Insulator Co., Newark, N. J., has begun operations at a new $2 million processing plant on Newark Bay, built by H. K. Ferguson Co., Cleveland. Plant will manufacture liners for bottle caps and will process cashew nut shell oil into commercial and industrial products.

—o—

Airco Export Corp., New York, a subsidiary of Air Reduction Co. Inc., has changed its name to Airco Corp. (International). In addition to handling the export actvities of Air Reduction, Airco handles overseas distribution of the products of several other firms, including stainless, electrical and special alloy steels of Allegheny Ludlum Steel Corp.

—o—

SKF Industries Inc., Philadelphia, manufacturer of ball and roller bearings, has begun its third annual session of managment training courses for SKF foremen and supervisors. The series of monthly conferences, seminars and classes on technical and management subjects will extend through next May.

—o—

Dravo Corp., Pittsburgh, has begun construction on a fleet of five hydrochloric acid barges for Dow Chemical Co., Texas Division, Freeport, Tex. Each of the barges will contain four 58,400-gallon tanks.

—o—

Pratt & Whitney Division, East Hartford, Conn., United Aircraft Corp., is developing an airplane engine for the U. S. Air Force which delivers more than 4000 hp to a propeller, as well as several hundred pounds of jet thrust.

—o—

Oster Mfg. Co., Racine, Wis., has closed its plant at Genoa, Ill., and moved operations to the factory of its Fairmount Corp., Milwaukee, producer of subassemblies for Oster's electrical appliances. The Oster plants at Racine are unaffected by the change.

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Vanadium Corp. of America, New York, is opening a new aluminum alloy plant at Eddystone, Pa. Facility will be in operation by the end of this month.

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American Radiator & Standard Sanitary Corp., New York, is nearing the final stage in negotiations with War Assets Administration for purchase of the former Consolidated-Vultee aircraft plant in New Orleans. Firm plans to convert the plant, at a cost of about $3 million, for manufacture of vitreous china plumbing fixtures.

—o—

Westinghouse Electric Corp., Pittsburgh, is conducting its eighth annual talent search for high school students with scientific aptitudes. Finalists in a series of tests will receive college scholarships ranging from $100 to $2800.

—o—

Diamond Steel Co. Inc., Chicago, reports it is equipped to flatten coils of steel or any metal up to 72 in. wide into sheets or strips of any length. Thickness ranges from 10 to 28 gage.

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Meehanite Metal Corp., New Rochelle, N. Y., will hold its annual research meeting of the manufacturers of Meehanite castings Nov. 11-13 at the Hotel William Penn, Pittsburgh.

—o—

William Jessop & Sons Ltd., Sheffield, England, has appointed Ackerlind Steel Co. Inc., New York, as a distributor of Jessop's tool steels.

—o—

Electric Products Co., Cleveland, manufacturer of stand-by electrical equipment, battery chargers and related products, has appointed Hubert Kaub & Co., Denver, as a sales representative for Colorado, Wyoming, Utah, New Mexico and El Paso county in Texas.

—o—

American Electroplaters' Society, Jenkintown, Pa., has established a fellowship, its second, at Princeton University, to intensify the study of the nature and effects of porosity in electrodeposits.

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Office of International Trade, Department of Commerce, has extended the deadline date for filing fourth quarter export license applications on iron bars and hot-rolled steel bars from Oct. 5 to Oct. 20.

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Stockham Pipe Fittings Co., Birmingham, has changed its name to Stockham Valves & Fittings Inc., to describe more closely the firm's expanded lines of bronze and iron body valves and fittings.

—o—

Baldwin Locomotive Works, Eddystone, Pa., reports that its order backlog has been swelled by $6 million by a U. S. Army Corps of Engineers contract for 12 hydraulic turbines. Orders include six turbines for the Wolf Creek power plant in Kentucky and three for the Center Hill plant in Tennessee.

—o—

W. & L. E. Gurley, Troy, N. Y., manufacturer of engineering and scientific instruments, has appointed the following dealers: L. L. Ridgway Co., New York, for the New York metropolitan area; Western Blueprint Co., Kansas City, Mo., for Kansas and western Missouri; and Wray Williams Co., Memphis, Tenn., for Tennessee and Arkansas.

—o—

Progressive Welder Co., Detroit, manufacturer of welding equipment, has appointed Progressive Welder Sales Co., Cleveland, as a sales representative. Ernest H. Lauter and George M. Omelianoff are principals in the sales firm.

—o—

Prefabricated Home Manufacturers' Institute reports that the 100,000th prefabricated home produced since the end of World War II was erected in the United States during September.

—o—

Acme Steel Co., Chicago, has moved its New Orleans office to 860 St. Charles Ave.

—o—

American Nickeloid Co., Peru, Ill., manufacturer of preplated metals in sheets and coils, is this year celebrating its 50th anniversary.

—o—

Sterling Mfg. Co., Cleveland, manufacturer of instruments and testing devices, has appointed Corey Co., New York, as its distributor in the New York metropolitan area.

—o—

Joseph T. Ryerson & Son Inc., Chicago, steel distributor, held an open house at its Pittsburgh area steel service plant recently which was attended by about 2500.

—o—

Westinghouse Electric Corp., Pittsburgh, has formed an Atomic Power Division which will be available to undertake atomic energy projects for the United States, as well as to carry on independent studies. Charles H. Weaver is manager.

—o—

General Electric Co., Schenectady, N. Y., has received orders from New York Shipbuilding Corp. to construct the geared turbine units that will power the three passenger liners under construction for American President lines.

The Business Trend

CONTINUING its upward climb, industrial production set another new postwar record as STEEL's index rose to 176 per cent (preliminary) of the 1936-1939 average for the week ended Oct. 9. If this high level of output can be maintained, a number of new records in various metalworking industries are in prospect.

Steel ingot production advanced 1 point to 97 per cent of capacity to mark the eighth consecutive week in which output has been 95 per cent or better, longest sustained period of peak operations this year.

AUTOMOBILES—Although the automobile builders of the United States and Canada were unable to maintain the output volume attained during the preceding week, 119,490 units rolled off the assembly lines during the week ended Oct. 9 for a total which was fourth highest for the year. Revised figures for the preceding week show that the 121,475 cars and trucks turned out were the highest for 1948.

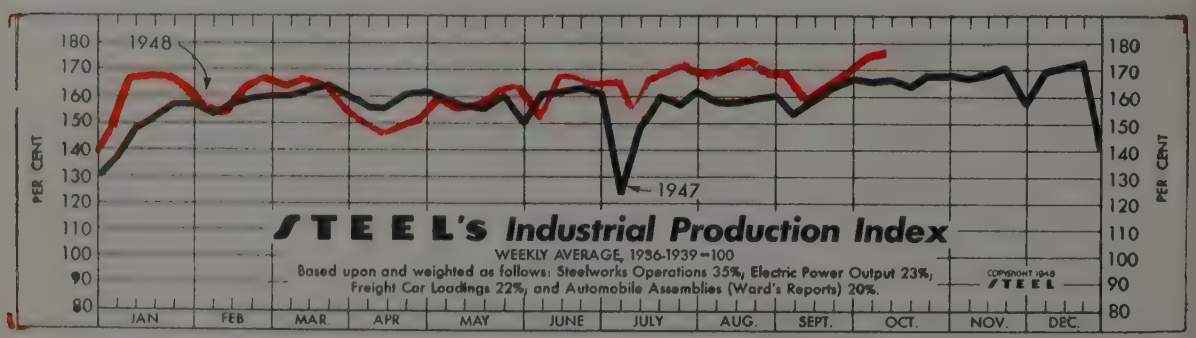
PRICES—Wholesale prices declined 0.9 per cent during the week ended Oct. 2 to 167.1 per cent of the 1926 average, according to the Bureau of Labor Statistics. Sharply lower farm products and foods were responsible for the decrease which put the bureau's index 0.2 per cent below a month ago but 6.4 per cent above the corresponding week last year.

INVENTORIES—Business inventories also reached a record level for the year of $52.7 billion at the end of August which was $907 million above the preceding month, according to the Commerce Department. Much of the overall increase, especially the $500 million inventory rise in the retail trades and $200 million in manufacturing, was primarily seasonal in nature in the opinion of department spokesmen. Wholesale inventories increased about $175 million during August, a month which usually shows little seasonal rise for this group.

FREIGHT CARS—September freight car deliveries, as announced by American Railway Car Institute, totaled 9753, bringing deliveries for first nine months of the year to 84,150 cars for an average of 9350 monthly. Production on the leading types of cars was 4327 box, 3614 hopper, 885 gondola, 300 refrigerator and 515 tank. Total backlog as of Oct. 1 was 108,907 cars, as compared with 117,815 a month earlier and 115,996 a year ago.

EMPLOYMENT—Employment declined in September for the second consecutive month, according to the Census Bureau. Total employment in September was 60,312,000, representing a drop of 933,000 from August and due almost entirely to return of young people to classrooms from summer jobs.

CONSTRUCTION—Estimates by the Bureau of Labor Statistics of construction activity in September, as measured by the value of work put in place, show a new monthly record of $1.8 billion. Total for the month is $381 million or 27 per cent higher than in September, 1947. Record dollar volumes were maintained or exceeded for most types of peacetime construction although rate of increase was not as great as in previous months.



Index (chart above): Week ended Oct. 9 (preliminary) 176 Previous Week 175 Month Ago 158 Year Ago 166

BAROMETERS of BUSINESS

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)†	97.0	96.0	95.0	95.5
Electric Power Distributed (million kilowatt hours)	5,450‡	5,449	5,426	4,958
Bituminous Coal Production (daily av.—1000 tons)	1,940	1,973	1,795	2,042
Petroleum Production (daily av.—1000 bbl.)	5,535	5,453	5,346	5,245
Construction Volume (ENR—Unit $1,000,000)	$170.2	$128.1	$106.9	$93.0
Automobile and Truck Output (Ward's—number units)	119,490	121,475	74,744	98,978

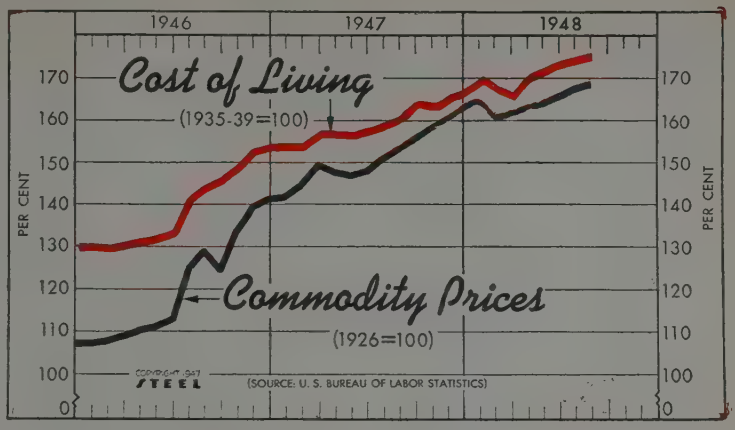
* Dates on request. † 1948 weekly capacity is 1,802,476 net tons. 1947 weekly capacity was 1,749,928 net tons. ‡ Preliminary.

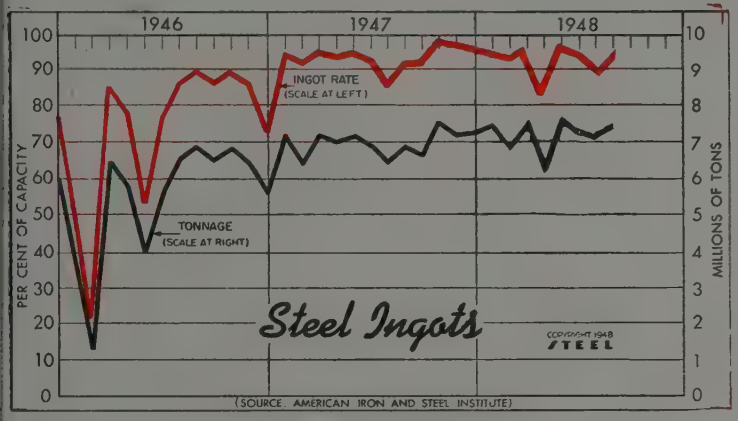
TRADE				
Freight Carloadings (unit—1000 cars)	911†	909	789	957
Business Failures (Dun & Bradstreet, number)	107	112	83	62
Money in Circulation (in millions of dollars)‡	$28,202	$28,080	$28,287	$28,632
Department Store Sales (change from like wk. a yr. ago)‡	none	+1%	+16%	+18%

† Preliminary. ‡ Federal Reserve Board.

Wholesale Commodity Price—Cost of Living Indexes

	—Commodities— (1926=100)			—Living Cost— (1935-39=100)		
	1948	1947	1946	1948	1947	1946
Jan.	165.7	141.5	107.1	168.8	153.3	129.9
Feb.	160.8	144.5	107.7	167.5	153.2	129.6
Mar.	161.4	149.5	108.9	166.9	156.3	130.2
Apr.	162.7	147.7	110.2	169.3	156.2	131.1
May	163.9	147.1	111.0	170.5	156.0	131.7
June	166.2	148.0	112.9	171.7	157.1	133.3
July	168.6	150.8	124.7	173.7	158.4	141.2
Aug.	169.4	153.6	129.1	174.5	160.3	144.1
Sept.	....	157.4	124.0	....	163.8	145.9
Oct.	....	158.5	134.1	....	163.8	148.6
Nov.	....	159.7	139.7	....	164.9	152.2
Dec.	....	163.2	140.9	....	167.0	153.3
Ave.	....	151.8	120.9	....	159.2	139.3





Steel Ingots

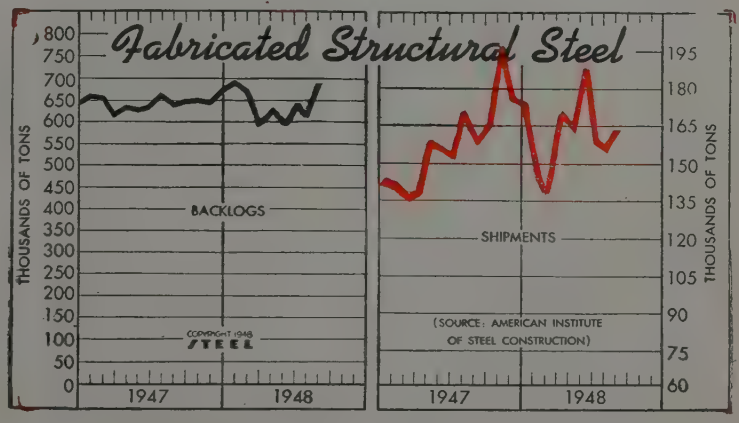
	Production (Net Tons—000)			Operating Rate (% of Capacity)		
	1948	1947	1946	1948	1947	1946
Jan.	7,473	7,213	3,873	93.6	93.0	49.6
Feb.	6,940	6,422	1,393	93.0	91.7	19.8
Mar.	7,608	7,307	6,509	95.3	94.3	83.3
Apr.	6,218	7,043	5,861	80.4	93.8	77.5
May	7,560	7,329	4,073	94.7	94.5	52.2
June	7,256	6,969	5,626	93.8	92.8	74.4
July	7,069	6,570	6,619	88.7	84.9	84.9
Aug.	7,418	6,982	6,924	92.9	90.1	88.7
Sept.	....	6,789	6,556	...	90.6	86.9
Oct.	....	7,560	6,952	...	97.5	89.0
Nov.	....	7,233	6,458	...	96.3	85.4
Dec.	....	7,366	5,760	...	95.2	73.9
Total		84,784	66,603	Ave.	92.9	72.5

Fabricated Structural Steel

(000 Tons)

	—Shipments—			—Backlogs—		
	1948	1947	1946	1948	1947	1946
Jan.	146.4	140.6	107.5	692	661	552
Feb.	141.6	136.1	63.8	673	656	551
Mar.	167.0	137.8	102.8	597	614	605
Apr.	166.7	157.4	122.5	630	632	674
May	186.9	155.0	124.4	593	628	615
June	157.1	151.9	126.8	647	634	642
July	156.1*	169.9	140.2	613	661	674
Aug.	163.4	158.0	157.5	691	639	651
Sept.	....	164.3	141.9	...	648	682
Oct.	....	196.1	164.7	...	649	660
Nov.	....	175.0	157.3	...	645	665
Dec.	....	173.0	142.1	...	671	646
Total	....	1,915.1	1,551.6			

* Revised.



FINANCE

	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$14,150	$14,020	$9,753	$13,362
Federal Gross Debt (billions)	$252.3	$252.3	$252.7	$259.8
Bond Volume, NYSE (millions)	$15.2	$17.7	$12.6	$21.9
Stocks Sales, NYSE (thousands)	3,484	4,633	3,962	5,256
Loans and Investments (billions)†	$61.9	$63.0	$63.2	$64.8
United States Gov't. Obligations Held (millions)†	$32,559	$33,921	$34,714	$38,400

† Member banks, Federal Reserve System.

PRICES

STEEL's composite finished steel price average	$95.05	$95.05	$95.05	$75.41
All Commodities†	167.1	168.7	167.4	157.1
Industrial Raw Materials†	179.7	182.4	180.7	172.9
Manufactured Products†	163.1	164.4	163.0	151.4

† Bureau of Labor Statistics Index, 1926=100.

Men of Industry

HUNTLY M. CAMPBELL

C. E. TWEEDLE

LEWIS W. METZGER

Huntly M. Campbell has been appointed sales manager, Mill Products Division, Western Brass Mills, division of Olin Industries Inc., East Alton, Ill. Before joining Western Brass Mills in 1940, Mr. Campbell was associated for five years with the Norge Division of Borg-Warner Corp., concluding this association as sales manager of the Norge Heating Division, with offices in Detroit. In his new capacity, Mr. Campbell will supervise sales of all Western's sheet and strip products manufactured in the East Alton and New Haven, Conn., plants.

—o—

Dawson J. Burns, who resigned the office of president, Ward Leonard Electric Co., Mt. Vernon, N. Y., in September of this year, has been elected chairman of the executive committee. He has been a member of the board of directors since 1903, serving the company as vice president from 1908 until 1944, when he was elected president. **Arthur A. Berard,** executive vice president and general manager since 1944, has been elected president and general manager.

—o—

Scully-Jones & Co., Chicago, manufacturer and designer of standard and special production tools, announces appointment of **Harry Conn** as chief engineer in charge of its Engineering Division. He was associated with International Harvester Co., Chicago, for many years, and in 1942 set up and directed LaSalle Engineering Co., New York. He also was chief engineer for Gridley Farm Tool Co. Inc.

—o—

H. N. Kirchdorfer has been named eastern division sales manager of the Parts Division, Reynolds Metals Co., Louisville. He will have headquarters at New York. Mr. Kirchdorfer has been with the company for 14 years. In 1943 he was named assistant vice president and assistant to **W. G. Reynolds,** vice president and general manager of the Parts Division. He retains the title of assistant vice president.

—o—

C. E. Tweedle, assistant to the president, Askania Regulator Co., Chicago, has been elected vice president of the company, which he joined in 1946. He previously had served in the U. S. Navy as commander, and was executive officer of the Administration Command, Great Lakes Naval Training Center. A graduate of Illinois Institute of Technology, Mr. Tweedle was engaged in consulting engineering work prior to the war.

—o—

A. J. Link has been appointed Chicago district sales manager, Signode Steel Strapping Co. For the past seven years Mr. Link has held the post of sales representative in Indianapolis. In his new duties he will direct the company sales in Minnesota and Wisconsin, as well as the Chicago sales area. **M. C. Carlson,** assistant sales manager and formerly Chicago district sales manager, will devote his entire activities to the control of field sales organization.

—o—

A. F. Vinson, formerly assistant production manager, apparatus department, and chairman of the welding committee, General Electric Co., Schenectady, N. Y., has been appointed manager of the company's Welding Divisions, which includes plants at Holyoke, Mass., Fitchburg, Mass., and Houston, Tex. **Vernon L. Cox** has been named manager of engineering for the Switchgear Divisions, succeeding **C. H. Black,** who was appointed manager of engineering, Construction Materials Divisions.

—o—

Lewis W. Metzger has been elected executive vice president of Midvale Co., Philadelphia. He also retains his former position as vice president of Baldwin Locomotive Works and executive assistant to **M. W. Smith,** executive vice president of Baldwin.

—o—

Ralph W. Seeley has been appointed vice president, Consolidated Western Steel Corp., at Los Angeles, and will be in charge of sales. He succeeds **Francis S. Howard,** who became vice president of the Southern Sales Division for Columbia Steel Co. Mr. Howard succeeds **Carl H. Wittenberg,** resigned.

—o—

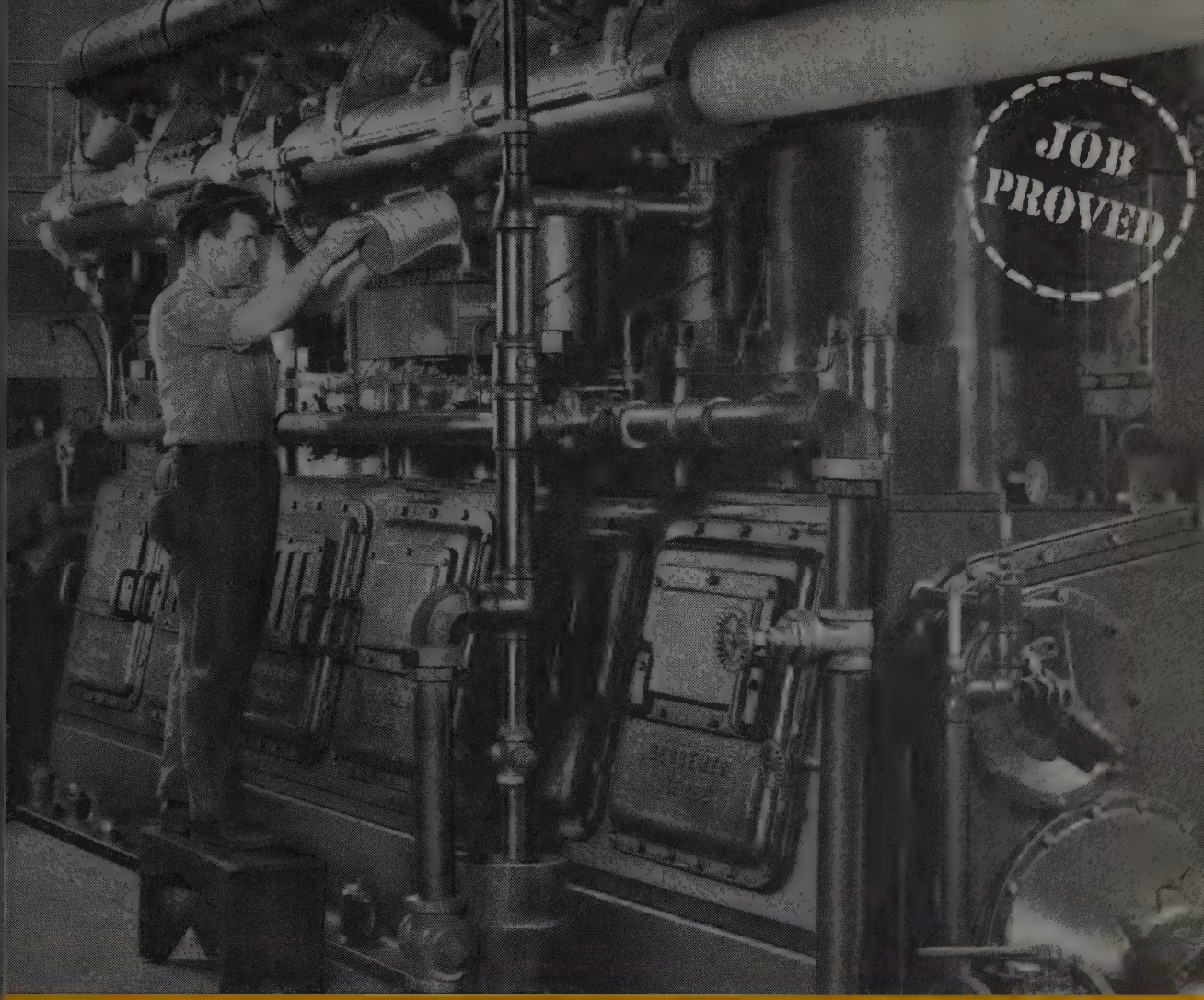
Gordon A. Weller has been appointed assistant manager of replacement sales, and **Frank A. Colosimo** has been appointed chief service engineer of American Brakeblok Division, American Brake Shoe Co., New York. Mr. Weller, formerly sales representative, has served in various sales capacities with the company. Mr. Colosimo has been in development and research work since first joining American Brake Shoe in 1934.

—o—

Charles A. Koons, head of Charles A. Koons & Co., New York, arrived in Tokio last week on a tour of the Far East to investigate business conditions and prospects. He will return to the United States Dec. 15.

—o—

Franklin L. Klocke has been appoint-



4,200 HOURS' OPERATION—STILL SLUDGE-FREE

Sun Diesel Lubricating Oil Almost Good As New After Outlasting a Competitive Product 5 to 1

A prominent manufacturer uses 6-cylinder, 4-cycle diesels to generate power. Recently, at the suggestion of one of our engineers, a Sun diesel lubricating oil was tried in one of the units.

Results were impressive. Inspected after three months, the engine was found to be in the cleanest condition since installed. In tests run against competitive oils, one manufacturer's products sludged up in 600 hours. Yet the Sun oil was practically as good as new after 3,000 hours, showing but a slight increase in neutralization number. In further tests, the Sun oil ran 4,200 hours in six months' operation without a change; the engine remained clean and sludge-free, and showed no signs of wear.

On the basis of this performance, the plant has extended the use of Sun oil to other diesel units.

Here is just one example of the records being set by Sun "Job Proved" lubricants in all their wide applications. You can rely on Sun products to keep diesels, turbines, steam engines and other power equipment operating smoothly and with minimum maintenance. To get complete information call the nearest Sun Office. For Technical Bulletin "Lubrication of Diesel Engines," write Department S-10.

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SUNOCO

ed factory representative for the Hewitt Rubber Division in North Carolina and Virginia, and the Hewitt Restfoam Division in the Southeast, by Hewitt-Robins Inc., Buffalo. He has been eastern product manager of the Hewitt organization since January of this year.

—o—

David D. Kennedy of Nunda, N. Y., and **Robert W. Frank** of Pittsburgh, have been elected directors of Blaw-Knox Co., Pittsburgh. Mr. Frank is president, Lewis Foundry & Machine Division, Blaw-Knox Co., and Mr. Kennedy is president, Foote Co., Nunda, a wholly-owned subsidiary.

—o—

Henry Y. Satterlee has been appointed to the factory sales engineering staff of Cannon Electric Development Co., Los Angeles. He has had connections with Curtiss-Wright Flying Service, Fairchild Engine Co., and in Los Angeles, Pacific Engineering Co.

—o—

Christian E. Jarchow, vice president and controller of International Harvester Co., Chicago, has been elected chairman of the board of directors of Controllers Institute of America. He succeeds **John H. MacDonald.**

—o—

Ekco Products Co., Chicago, announces appointment of **Charles H. Newman** as assistant general sales manager of the company. **John Brooks** and Mr. Newman, as assistant general sales managers, will direct household sales. Prior to joining Ekco, Mr. Newman was vice president and general sales manager, Silex Co., Hartford, Conn.

—o—

Porter S. Kier has been elected secretary, American Cladmetals Co., Carnegie, Pa. Since 1946, Mr. Kier has acted as public accountant for the company, and in 1947 became assistant secretary, assistant treasurer, and a director. He recently resigned from his previous position as treasurer and a director of Columbia Radiator Co. in order to devote full time to American Cladmetals Co.

—o—

J. Harvey Shilling has retired after 31 years with Youngstown Sheet & Tube Co., Youngstown. He served 14 years as superintendent of the company's rod and wire plant at Struthers, O.

—o—

Sir Ellis Hunter has been appointed chairman of Dorman, Long & Co., Middlesbrough, England, succeeding the late **Lord Greenwood.** Sir Ellis, who joined the company as deputy chairman in 1938, and managing director the following year, will combine the offices of chairman and managing director.

—o—

John S. Ewing has been appointed assistant manager, Stainless Steel Division, Carnegie-Illinois Steel Corp., Pittsburgh. He joined this U. S. Steel Corp. subsidiary in 1936. After a leave of absence to serve in the Ordnance Department, U. S. Army, from 1942 until 1945, he returned to the company's Pittsburgh office as sales engineer in the Stainless Steel Division, and in 1946 was made product representative, the position he held at the time of his present appointment.

—o—

Walter D. Binger has been elected a director of National Radiator Co., Johnstown, Pa. He is vice president of City Investing Co. and president of City Construction Co., New York.

—o—

George W. Wolff has been promoted to the position of assistant sales manager, Willard Storage Battery Co., Cleveland. He is succeeded by **A. L. Blackwell,** formerly Cleveland district sales representative, in the position of national service manager.

—o—

Newcomb-Detroit Co., Detroit, announces appointment of **Orrin E. Fenn** as chief engineer of its Grand Rapids Division, which manufactures industrial air handling equipment. Mr. Fenn has been in this field for over 20 years. He formerly was chief engineer, Peters-Dalton Co. In addition to his duties as chief engineer, Mr. Fenn will also head up sales engineering for Newcomb-Detroit in western Michigan, Indiana, Illinois and Wisconsin.

—o—

Dan Mandery has been named to head the Platecoil Division of Kold-Hold Mfg. Co., Lansing, Mich. He has served many years in refrigeration, heating and air conditioning, covering both sales and service. After association with Frigidaire sales and service, he joined Hussman Refrigerator Co. More recently he has been associated with Universal Cooler Co.

—o—

James M. Ashley, Toledo, O., has been elected president of Producers' Council, an organization of building products manufacturers. He is the director of public relations, Libby-Owens-Ford Glass Co. He succeeds **David S. Miller,** Armstrong Cork Co., Lancaster, Pa.

—o—

Marcus A. Markley has been appointed manager of the industrial products department, Sun Oil Co., Philadelphia. He succeeds **Ray H. Anders,** assigned to do special work in the administrative department. Mr. Markley has been Industrial Products Division manager of the New York region. **James E. Stine Jr.,** formerly industrial products department manager, New York, will succeed Mr. Markley, and **Francis F. Palmer** will succeed Mr. Stine. Mr. Palmer has been serving as industrial products salesman at Rochester, N. Y.

—o—

Harvey N. Barrett Jr. has been named assistant manager of sales for Basic Refractories Inc., Cleveland. He has been associated with the company for the past nine years in various sales and product development assignments, and served most recently as assistant to the vice president in charge of sales.

—o—

G. Mayne Daly has been appointed southern sales manager of the Pole Line Hardware Division, Oliver Iron & Steel Corp. He formerly was northeastern district manager with headquarters in New York. In his

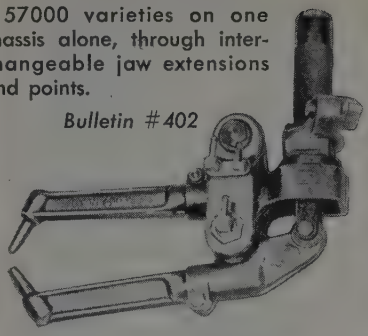
ORRIN E. FENN

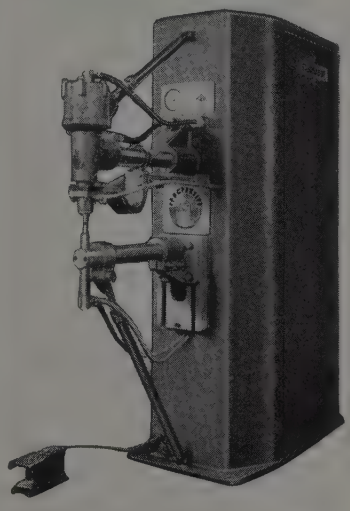
HARVEY N. BARRETT JR.

STANDARDIZED GUNS

57000 varieties on one chassis alone, through interchangeable jaw extensions and points.

Bulletin #402

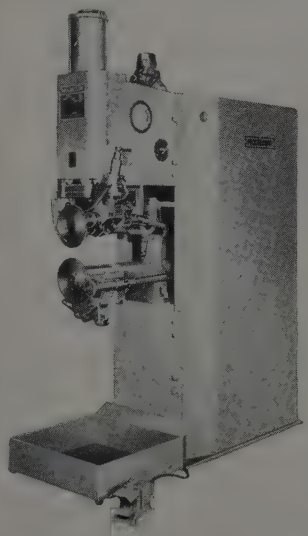




PEDESTAL SPOT WELDER

The "universal" spot welder. Built to take it, and how! Quickly adjusted to a variety of jobs.

Bulletin #503



ROLLER HEAD SEAM WELDERS

Another Progressive "first." The roller head follows changes in metal thickness uncannily. You can seam weld faster and better.

Bulletin #804

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Here are seven reasons why Progressive today is the largest supplier of resistance welding equipment to industry.

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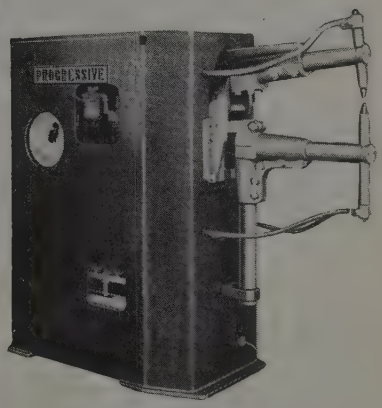
For either projection or spot welding. Here, too, the roller head speeds follow-up — gives better welds. Rigid? Take a look at the frame in

Bulletin #603



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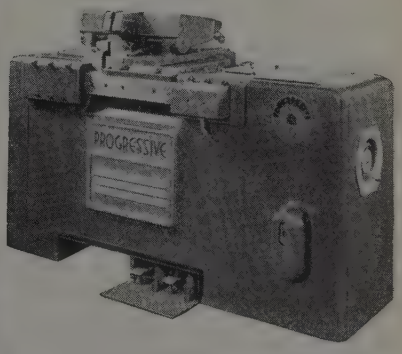
For all kinds of light to medium duty jobs. An up-to-the-minute "triple" threat: real "beef," real speed, and real adaptability.

Bulletin #702



FLASH WELDERS

Combine the advantages of standard and special machines. More features than you would believe possible on a standard machine.

Bulletin #204

new capacity Mr. Daly will be in charge of the company's warehousing facilities in Birmingham, and will also have sales supervision over eight states in the southeastern section.

—o—

Zenith Radio Corp. has appointed **Fred L. Heblom** factory manager at Chicago. He has been with the firm since 1941.

—o—

Ralph M. Hoffman, president, Link-Belt Co., Pacific Division, San Francisco, has been elected a vice president of the parent Link-Belt Co. He has served in many executive capacities in both the parent and subsidiary companies. He continues president of Link-Belt Co., Pacific Division, the position he has held since 1943.

—o—

Eastern Stainless Steel Corp., Baltimore, announces appointment of **James G. McKillen Jr.** as sales representative, with headquarters in Cleveland. He served for 15 years with the sales staff, Armco Steel Corp. During World War II he served as chief engineering officer, Naval Air Station, Barbours Point, Hawaii.

—o—

John A. Storrs has been appointed sales representative in the New York district for Kennametal Inc., Latrobe, Pa.

—o—

Walter G. Hildorf, chief metallurgical engineer, Western Division, Timken Roller Bearing Co., Canton, O., has been awarded the War-Navy certification of appreciation for his outstanding contribution to the war effort while chief metallurgist of the Timken company. He is now stationed in Los Angeles, where he was transferred in 1947.

—o—

John C. Ingram has been appointed manager of material department, Canonsburg, Pa., plant of Fort Pitt Bridge Works. He succeeds **Fred R. Wilson,** who retires after serving the company for 49 years.

—o—

George W. Anselman, for the past five years service engineer, Goebig Mineral Supply Co., Chicago, has become foundry superintendent, Woodruff & Edwards Inc., Elgin, Ill. Prior to 1943, Mr. Anselman was associated with Ayers Mineral Co., Zanesville, O., as service engineer and superintendent of the company's Tennessee mill.

—o—

W. Rex Becker has been appointed sales manager of standard lines, Conduit Products Division, General Electric Co., at Bridgeport, Conn. He is succeeded in his former position as product promotion manager, Wiring Device Division, by **Roger F. Hinckley.**

C. H. LAGE

M. R. SKIRVIN

—o—

C. H. Lage, general works manager for LaPlant-Choate Mfg. Co. Inc., Cedar Rapids, Iowa, for the past four years, has been apponted to the position of vice president and general works manager of the company.

—o—

Reg Anderson has been appointed sales engineer for New York and New England by Threadwell Tap & Die Co., division of Sheffield Corp., Dayton, O. He has been with the company for 16 years, serving in production, inspection and sales work. For several years Mr. Anderson was chief inspector of the division.

—o—

Roy B. Bender has been appointed general service manager of Studebaker Corp., South Bend, Ind., succeeding **D. O. Wilson,** who recently resigned after 36 years of service with Studebaker, 24 of them as general service manager. Mr. Bender has been with Studebaker since 1939. He became Cleveland regional manager in 1945.

—o—

George W. Pontius, chief engineer of the new devices section, has been appointed manager of automotive engineering at Bendix Products Division, South Bend, Ind., plant of Bendix Aviation Corp. He has been associated with the company for 17 years.

—o—

Herman B. Campbell, vice president in charge of operations, Harbison-Walker Refractories Co., Pittsburgh, has retired after 44 years of service with the company. He became associated with the company in 1904 at the Portsmouth, O., plant, and later was appointed district superintendent of Ohio and Kentucky districts and later Alabama. He went to Pittsburgh in 1922, and since 1939 has been operating vice president.

—o—

Cimcool Division, Cincinnati Milling Machine Co., Cincinnati, announces the opening of a new direct Cimcool sales office at 4053 Lindell Blvd., St. Louis. **M. R. Skirvin** will be in charge of the new office, which will be responsible for the sale of Cimcool cutting fluid in the St. Louis territory.

—o—

P. H. Noland, president, B. F. Avery & Sons Co., Louisville, has been elected president of the Farm Bureau Equipment Institute. **Theo. Johnson,** president, J. I. Case Co., has been elected chairman of the executive committee, and **P. H. Kroll,** president, Gleaner Harvester Co., elected to the executive committee.

—o—

Stanley H. Hobson, president, George D. Roper Co., has been installed as the new vice president of the Gas Appliance Manufacturers Association. He succeeds **Frank J. Nugent.**

—o—

G. Lester Jones has been named chief engineer of Lear Inc., Grand Rapids, Mich.

—o—

James A. Nary, formerly of Chicago, has been named vice president in charge of production of the United States Testing Co. Inc., Hoboken, N. J.

—o—

H. D. Stott has been named manager of personnel, Car Works Division, Pullman-Standard Car Mfg. Co., Chicago. He succeeds **H. V. Sherman,** who has been promoted to duties in the company's main office.

—o—

Ronald A. Johnson has been appointed assistant to **Paul Brainard,** head of the newly created engineering standards department at the Portland,

Oreg., plant of Hyster Co., manufacturer of industrial trucks and tractor tools.

—o—

S. L. Nevins has joined Mathieson Chemical Corp., New York, as general manager of the company's newly formed ammonia department.

—o—

Raymond L. Coultrip has been appointed director of engineering research for Bendix Home Appliances Inc., South Bend, Ind. He formerly was project engineer in charge of range development, Maytag Co.

—o—

Joseph N. Banky, electrical engineer since 1943 with Allis Chalmers Mfg. Co., has been named a sales representative in the company's Chicago district office.

—o—

Dalzen Tool & Mfg. Co., Detroit, has appointed **Paul T. Peterson** to the position of chief engineer in charge of the design and manufacturing of all types of broaches, broach fixtures and general broaching. Mr. Peterson had formerly served in similar positions with Apex Broach Co. and Colonial Broach Co., both of Detroit.

—o—

F. R. Lack has been elected president of Westrex Corp., New York, which is a subsidiary of Western Electric Co., succeeding **T. K. Stevenson** who resigned. **G. L. Best** was elected a

ROBERT E. COLEMAN

director of the firm to fill the vacancy on the board caused by Mr. Stevenson's resignation.

—o—

Robert E. Coleman has been named vice president in charge of sales, Acme Pattern & Machine Co. Inc., Buffalo, and will be located in New York. He previously was sales manager of Pivot Punch & Die Corp., and during the war was located in Detroit. **William A. Carlson,** formerly works manager, Racine Tool & Machine Co., Racine, Wis., has been named vice president in charge of manufacturing of Acme Pattern & Machine Co. **Henry M. Williams** has joined the company after previously having served with Kane & Roach Inc., Syracuse. He has been appointed chief engineer, Fabricating Equipment Division. **Nelson M. Hopkins** has been appointed assistant to the president. Prior to this appointment he had been sales manager of Kane & Roach Inc., and during the war was with Curtiss-Wright Corp., Buffalo.

—o—

Arthur W. Carpenter, manager of physical testing laboratories at the Akron plants of B. F. Goodrich Co., has been loaned to the government for service on the National Security Resources Board and is in Washington for three months. Mr. Carpenter is a former president of American Society for Testing Materials and held several posts with the War Production Board during the war.

—o—

Kerotest Mfg. Co., Pittsburgh, has appointed **Adrian Van Kampen** to its southwest sales division with headquarters at Houston, Tex. Mr. Van Kampen was formerly associated with Allis-Chalmers Mfg. Co., Milwaukee.

—o—

A. R. Senter has been appointed manager of Ashland Fabricating Division, Ashland, Ky., of Armco Drainage & Metal Products Inc., Middletown, O. He succeeds **Willard See** who died recently.

OBITUARIES . . .

Lauson Stone, 65, president and board chairman of Follansbee Steel Corp., Pittsburgh, died Oct. 8 following a stroke. Besides his position with Follansbee, Mr. Stone was director of Federal Enameling & Stamping Co., McKees Rocks, Pa., a subsidiary of Follansbee. Mr. Stone was a brother of former Chief Justice Harlan Stone. A graduate of Purdue University in engineering, he had been connected with Jones & Laughlin Steel Corp., Pittsburgh, for 23 years prior to joining Follansbee in 1942.

—o—

A. H. Wyman, 66, Cleveland district manager, Allis-Chalmers Mfg. Co., died Oct. 5.

—o—

Joseph H. Clark, 75, former president, Johnston & Chapman Co., Chicago, metal perforating firm, died Oct. 9 in Los Angeles, where he had lived since 1940.

—o—

Wiliam M. Olsen, 53, western district sales manager for Lamson & Sessions Co., with headquarters in Chicago,

LAUSON STONE

died there Oct. 5. He served as manager of the Detroit sales office for many years prior to his Chicago assignment.

—o—

Henry A. Barren, 86, vice president of American Steel & Wire Co., Cleveland, prior to his retirement died Oct. 8. He joined the Cleveland Rolling Mills in 1877 as a workman in the Newburgh plant and remained with the successor firm, American Steel & Wire, holding various executive posts until his retirement in 1929.

—o—

Karl O. Schreiber, 56, vice president in charge of manufacturing, International Harvester Co., Chicago, died Oct. 5 in Evanston, Ill. He became associated with the company in 1917 as general foreman of the company's motor truck assembly plant, then located in Akron. Mr. Schreiber held various posts until elected vice president in 1941 to head all manufacturing operations.

—o—

Max Israel, vice president and one of the founders of Dayton Bronze Bearing Co., Dayton, O., died there recently. He was formerly connected with Israel Bros. Co. in the same city.

—o—

Mathew R. Rosse, 50, export manager of Colorado Fuel & Iron Corp., Denver, died Oct. 7 in New York. Mr. Rosse had been associated with the exporting of steel products and industrial equipment for 25 years.

Hot ideas mean cold cash for you!

1.

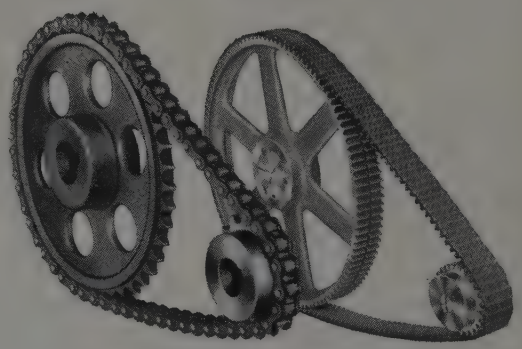
"Shut 'er down!" How steel makers hated those words. For every shut-down caused by failure of the steel feeding mechanism made ton-costs mount. High temperatures, giant loads and speed—all major factors in feeding steel to heat-treating furnaces—had bad effects on power transmission equipment. Sit and wait? Not steel makers! They swung into action to beat the heat. They consulted . . .

2.

Morse Chain Engineers, who helped solve their whale-sized power problem by installing Morse Roller Chain and Sprockets. Tough, fast-moving, easily maintained Morse Roller Chain now does a superb job of positive power transmission in many steel mills. Similar jobs call for quiet, powerful Morse Silent Chains and Sprockets. Both types of Morse Chain practically eliminate power losses and costly replacements. Possibly . . .

3.

Morse Roller or Silent Chain can be used on your product or in your plant. Ice cream machinery manufacturers use it on *their* products. So do manufacturers of machine tools, petroleum equipment, agricultural equipment, cranes, fans, hoists, conveyors and many, many other products. The use of Morse equipment on your products will add much to their value and sales appeal. So, don't wait . . .

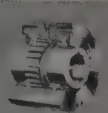


4. Roller Chain Silent Chain

Write us now for the very latest information on Morse Chain equipment. Send for Silent Chain Catalog C71-48, and Roller Chain Bulletin B57-47. Address Morse Chain Company, Dept. 237, 7601 Central Ave., Detroit 8, Michigan.

Morflex Couplings

Roller Chain Couplings

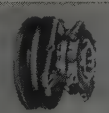


Morse-Formsprag Clutches

MORSE

MECHANICAL *POWER TRANSMISSION* PRODUCTS

A PRODUCT OF B-W BORG-WARNER



Morse-Rockford Friction Clutches

MORSE CHAIN COMPANY • DETROIT 8, MICHIGAN

Engineering News . . . AT A GLANCE

ERSATZ FINISH—Finishing problem resulting from the shortage of enameling steel now may be further eased by a synthetic enamel developed recently by Sherwin-Williams Co., Cleveland. Performing equally as well as porcelain in many applications, the finish is particularly outstanding in its resistance to alkalis and acids. Laboratory tests using a 10 per cent alkali solution in one instance, and a 10 per cent solution of sulphuric acid in another, left it in good condition after 18 months exposure. The finish also withstood 5000 hours of humidity test and 2000 hours of salt spray exposure without failure. One large fabricator already is using it for covering aluminum washing machine tubs.

"BACKED-UP" INDUSTRY—All metals and metal oxides are considered practically available for storage battery construction, an investigation completed by Dr. Eugene Willihnganz, director of research, Gould Storage Battery Laboratories, Depew, N. Y., points out. It reveals that practical batteries are possible only with the following combinations —for the positive active material, lead peroxide, nickel peroxide, manganese dioxide, molybdenum trioxide; for the negative material, manganese, zinc, chromium, iron, nickel, lead; for the electrolyte, water solutions of sulphuric acid, sodium hydroxide or other sodium compounds. Cadmium is ruled out on the basis of insufficient total world production and limited known deposits. None of the possibilities, however, shows enough immediate promise to endanger leadership of lead and nickel batteries for many years to come.

"MIRACLE" SYNTHETIC—Abrasive resistance is reported to be increased tremendously in such products as V-belts, industrial hose, rotor and stator tubes etc., by the use of "cold" rubber, according to Gates Rubber Co., Denver, Colo., one of the first processors to receive supplies of the new "miracle" synthetic in commercial quantities through participation with the Copolymer Corp., in pioneering the low-temperature processes. It is pointed out that by processing the product at temperatures of 41 down to 0°, as against the 122° previously required, greatly increased control over the molecular structure is obtained, resulting in a rubber that withstands abrasion fully 30 per cent longer than natural rubber.

SELF-CONDITIONING LAP—By devising a means for truing-up a lapping surface faster than the work can "untrue" it, engineers of Crane Packing Co., Chicago, have reduced the highly specialized art of precision lapping to a machine operation within reach of any shop requiring such facilities. Machine developed and recently introduced by the company includes wear rings that "ride" on the motorized lapping table. As the table revolves, wear rings, workholders, and individual workpieces are free to generate their own axes of rotation. Because rings are constantly and uniformly wearing the lapping table during the entire cycle at a greater rate than wear caused by workpieces, lapping surface is continuously maintained in a state of perfection. Rate of metal removal from the work is also faster because the machine is continuously presenting a newly-conditioned lap surface to the work.

RESEARCH IN ACTION—No stones are left unturned when metallurgical scientists roll up their "collective sleeves" to conduct an investigation. Case in point is the recently completed research on how various shot hardnesses affect endurance life of helical springs, reported by F. P. Zimmerli, chief engineer of Barnes-Gibson-Raymond Division, Associated Spring Corp., Detroit. Six different lots of shot were involved. X-rays were used to determine depth and magnitude of internal spring stresses, and hardness was checked on all six lots by two laboratories—Chrysler's and Battelle Memorial Institute's. Shot life tests were conducted by American Wheelabrator, with General Motors' research lab further classifying the shot for size. (p. 126)

STOVES STILL NEEDED—Use of oxygen in the conventional present-day blast furnace will not eliminate the use of stoves for preheating the blast, it is pointed out by Julius H. Strassburger, manager, department of service and maintenance, Weirton Steel Co. The additional heat in the blast, he states, is necessary to maintain the proper heat input to the furnace. Actually, if oxygen is used with cold blast there is a definite deficiency of heat input for maintaining the blast furnace operation. (p. 148)

TWO-TONE PLATING—Method of mass-producing a part with both gold and chromium plating on a single die cast metal was developed recently by Continental Die Casting Corp., division of F. L. Jacobs Co., Detroit.

Initially devised for application on an auto hood ornament, method can be adopted for use in manufacturing similar decorative products of other industries. In the process, the casting is first given a copper bath for hardening, then one of nickel for corrosion resistance. Masking material, a copper-nickel metal covered by a plastic coating, is then bridged across the area to be gold plated. With the masking material held securely in place by wire, the casting is chrome plated. Mask is then removed and the casting is gold plated. Latter is then sprayed with enamel and baked for an hour to provide a protective coating for the gold.

SHOT

How It Affects

By F. P. ZIMMERLI
Chief Engineer
Barnes Gibson Raymond Division
Associated Spring Corp.
Detroit

RECENTLY completed investigation to determine how various shot hardnesses affect endurance life of helical springs produced the following conclusions: (1) Throughout the range of hardness tested in the shot there was no significant effect on the ultimate endurance limit of the springs. (2) Size of shot did not affect the endurance limits within certain limitations. (3) Springs can be overpeened with coarse shot. (4) There is no relationship between arc height and endurance limit. (5) From breakdown tests it appears that shot life is inversely proportional to hardness of shot. (6) Smooth, nonpeened appearance of samples using steel or soft shot will cause a departure from the usual visual inspection methods for peening.

As a matter of interest, attempts were made to determine the possibility of overpeening springs even using shot known to be large for wire size in the spring. On all tests Almen strips were included with the springs. If correlation of the Almen arc height and spring life were possible, the tests run would establish this fact. Six different lots of shot were used. These included one lot of P-46, one of P-28, and four of P-16. Of the P-16, one was steel, two were heat treated white cast iron, and one was white cast iron as were the P-46 and P-28. Physical and chemical tests were run on all six types of shot.

Use of x-rays to determine the depth and magnitude of internal stresses was tried. Springs were all from one coil of oil tempered valve spring wire. The springs were coiled, heated, ground and processed at the same time so as to insure a uniform specimen.

Shot—Shot used in this investigation consisted of six different lots. Four of these were furnished by Pittsburgh Crushed Steel Co. These were all P-16 shot and are labeled lots 100, 101, 102, and 103. All of these were white iron shot with the exception of lot 100 which was steel. Two of the shot samples were our own regular white iron production shot, sizes P-28 and P-46. The P-28 was "steel blast" shot and the P-46 was purchased from W. R. Shields. These lots are labeled P-28 and P-46 in this report.

Hardness was checked on all six lots of shot by two laboratories, Chrysler Laboratory and Battelle Memorial Institute. Results given in average rockwell C hardness converted are given in Table I. Chemical analysis is shown in Table II.

Breakdown or shot life tests were run by John C. Straub of American Wheelabrator & Equipment Corp., Mishawaka, Ind. He tested the P-16 shot in two different ways: One was at constant wheel speed and the other at constant arc height on an Almen strip. His results are given in Table III as are the results of two wheel speeds on the P-28 and P-46.

Testing shot at the same wheel speed shows that the arc height of each lot for the P-16 shot bears a direct relationship to the hardness of the shot. Shot life for the cast iron shot is inversely proportional to the shot hardness. Steel shot has a much longer life than iron shot. Since we only had one hardness to test, we have no data upon the relationship between shot life and hardness for steel shot. Another interesting thing is that for the same wheel speed, 9800 revolutions per minute, there is not a great deal of difference in shot life for any of the hard white iron shots regardless of shot size (See P-16, P-46 and Lot 101).

When wheel speed was varied to obtain a constant arc height of 0.007 A-2, it would appear there is an optimum hardness for shot life. Lot 102 showed the longest life although it was not the softest shot. This applies, of course, to the iron shot. The steel shot had much the longest life, but the difference was not so pronounced as at constant wheel speed. Another thing, which might be expected, was that to obtain a constant arc height with the various lots of P-16 shot the wheel speed had to be increased as the hardness of shot decreased.

On the P-28 and P-46 shot, breakdown tests were made at arc heights of 0.012 and 0.017-inch, respectively. These arc heights corresponded to a wheel speed of 3000 revolutions per minute. Under these conditions the life of the P-28 shot was decidedly longer than that of the P-46 shot.

In order to judge the shot further, R. L. Mattson of General Motors Research Laboratories classified the shot for size. Samples were run before use and after 4 hours in service. These results are given in Table IV. The letter "A" added to the shot designation number stands for used shot. This shot peened the sample springs for endurance testing, and use was continued to the 4-hour period mentioned.

Table IV shows how badly the white cast iron shot breaks down in use. It also shows that the softer shots do not break down nearly as much. Analysis of the shot as received also shows that, while the P-16 and P-28 shots were very close to the specified size, over half of the P-46 shot was finer than it should be.

Samples of all of the various lots of shot were mounted in bakelite, polished and etched, and examined microscopically. This confirmed the fact that in both the steel and the heat treated iron shots there was a very wide variation in structure. Hardness tests also showed a lot of scatter on these lots of shot. White iron shot was reasonably uniform in structure.

In order to check Straub's machine in a crude commercial way we saved all dust collected from each shot used over a 4-hour period. Constant and uniform conditions were maintained, so the results are strictly comparable. Each shot peened 2 hours on fatigue samples and 2 hours on a "dummy" charge

of springs. This dummy charge was used for all springs. The results of this test are:

Shot	Dust Recovered (No.)
P-46	17.1
P-28	18.1
P-16 Lot 100	1.4
P-16 Lot 101	24.7
P-16 Lot 102	2.0
P-16 Lot 103	0.6

In general these results agree with Straub's findings. It seems that our figures for the steel shot lot 100 are high and we believe this can be explained by the fact that the steel shot was rust covered as received. We also feel that with longer tests Lots 102 and 103 might increase.

test were then put in the machine. The only exception to this was on the P-16, lot 100 steel shot, and in this case only 200 pounds were available. Two Almen A strips were then placed in the machine; it was run 2 minutes with the belt stationary. One hundred fatigue machine springs together with eight Almen strips were then loaded into the machine.

After running the Wheelabrator 5 minutes, 25 springs and two Almen strips were removed. This was repeated at such intervals that we obtained springs and Almen strips which had been shot peened for 5, 15, 30, and 120 minutes. The machine was then loaded with scrap springs and run an additional 2 hours. Then two more Almen strips were placed in the machine and shot peened for 2 minutes without running the belt. Amount of dust collected dur-

QUALITY

atigue Life

Investigation to discover how shot hardness affects endurance limit of helical springs turns up some significant facts on results to be expected from shot peening

Springs for Tests—In order to obtain springs which we could shot peen and obtain uniform results, several bundles of oil-tempered wire were tested for endurance. A bundle of 0.148-inch wire was chosen that, by our methods of fatigue testing, was acceptable valve spring wire but on the low side of the endurance values for such material. In this way, anyone could expect to receive as good or better results than we would report. Usual chemical and physical tests gave: C—0.63; Mn—0.83; P—0.015; S—0.022; Si—0.21.

Physical tests were as follows:

Ultimate tensile strength	—221,000 psi
% Reduction of area	—55½%
Rockwell hardness	—43 C

Acid etching samples of the wire showed it to have a satisfactory surface for this type of material. Microscopic examination showed the structure to be uniform and the wire to be free from surface decarburization. Springs made from this wire had the following specifications: 0.148-inch wire; 1 7/32-inch outside diameter; 2-inch free length; 3¾ active coils; 5¾ total coils; ends squared and ground.

After coiling springs were blued at 750° F for ½-hour in a Circ-Air draw furnace. Ends were then ground. Springs were not pressed.

Shot Peening Procedure — Shot peening of the fatigue machine springs was done in a Wheelabrator which had a 15-inch wheel running at 2300 revolutions per minute. Shot feed was 300 pounds per minute. Procedure for a test for each lot of shot was as follows:

The Wheelabrator was thoroughly cleaned to insure that the shot being tested was not mixed with old shot. Three hundred pounds of the shot under

ing the entire run was then weighed to obtain an indication of how much shot had broken up in the run.

Intensity of Shot Peening as Measured by Almen A Strips—All Almen strips were rockwelled before using. An average of the various Almen A2 reading for the different times for each lot of shot are given in Table V.

It will be noticed that the arc height in each case reaches a fairly high value for the shot in question and then continues to rise very slowly with time. There is one exception to this on the 15 minute run of P-16 lot 100 shot. In this case the strips for the 5 minute run were 45.5 rockwell and for the 15 minute run 48. The lower the rockwell hardness the higher is the Almen reading so this may partially explain this discrepancy. These tests show very conclusively that the Almen reading goes up as the shot size increases. It also shows that for the same size shot the Almen reading goes up somewhat as the shot hardness increases. In this case the difference appears to be somewhat more pronounced for the shorter peening times although it holds true in every instance in our tests.

Difference in Almen readings taken before starting the shot peening of springs and after the finish of the peening tests, i.e., the 2 minute runs, must be attributed to breakdown of the shot. For the hard shot there is a great difference in the readings. For the two softer lots of shot there is none. In fact the last runs are a little higher than the first ones although we believe this can only be due to experimental error.

Measurement of Shot Peening Effect by X-Ray Dif-

Report of research program conducted by the author for the SAE Shot Peening Committee.

SHOT QUALITY

fraction Methods—D. M. McCutcheon of the Applied Physics department of the Ford Motor Co. has been working for several years on a method to measure the combined stresses present at or near the surface of metals. The technique of this method is somewhat involved but he has perfected it to a point where he has been able to present some very interesting data. He has Almen strips from all of our shot peening tests and hopes eventually to provide us with data which will give an idea both as to the magnitude of the stresses and to depth of shot peening effect.

Preliminary work which he has done for us previously on valve springs shows combined stresses at the surface of around 50,000 pounds per square inch. At 0.002-inch to 0.004-inch from the surface these stresses go up to around 90,000 pounds per square inch. His tests would indicate that the effect of the peening extends to at least 0.010-inch in the steel. Other work of his would indicate that on an Almen strip for the same length of time you might expect about twice shot peening effect as on round wire.

Fatigue Tests—After shot peening, all fatigue machine springs were heated to 450° F for ½-hour. Then they were placed in the fatigue machine in sets of eight at such stress ranges that we could determine the highest range at which the springs would withstand 10 million loadings.

This machine was completely described and illustrated in the paper, "Shot Blasting and Its Effect on Fatigue Life" published in the 1941 "Symposium on Surface Treatment of Metals" by the American Society for Metals. Briefly, it consists of a double throw crankshaft to which, by means of connecting rods, a walking beam is attached. Upright rods to a header transmit the motion to springs mounted on a heavy beam which forms the top of the machine. The whole is driven by a variable speed electric motor. Magnetic relays stop the machine, should the spring break. A counter reduced 100-1 automatically records the number of spring compressions while the machine is running. The motor speed range of 1100-3300 revolutions per minute was carefully tested by means of synchronized neon light to be sure no surge or other loading in the machine parts was present to change the calculated stress. For these tests a speed of 2000 revolutions per minute was used.

Results complete to date are given in Table VI. The stress ranges given as endurance limits are based on 10 million cycles and have been corrected to allow for the set occurring in the springs during the test.

It will be noted that in one place we could only establish an endurance limit of less than a given figure while in another place we have given it as over a figure. In these instances we had insufficient springs to complete our tests. First thing to notice in Table VI is that in every case the shot peening treatment increased the endurance limit of the springs. For the lowest figures given we have increased the safe stress range 19.3 per cent. For the highest endurance limit the increase in safe stress range is 56.7 per cent.

It is at once apparent that the P-46 shot is too coarse for these springs. While it has increased the endurance limit over the springs which have not been shot peened, the values in the table are in almost every case lower than for any of the other shot. There would appear to be a tendency to over shot peen with this shot for long times of peening but the differences are hardly more than experimental error.

In the case of the P-28 shot we have a value for our 15-minute run which appears low. Actually, for some reason we have not been able to determine, this was caused by the springs setting more than usual during the tests. Stress range is comparable to the other runs with the exception of the springs peened for 2 hours. The fact that this test is somewhat lower does not necessarily indicate much, because we have a 3000 pounds per square inch possible machine and setup error. However, it might be well said that the springs are shot peened to the practical limit.

From data on the various lots of P-16 shot, it does appear that we are obtaining endurance limits that are strictly comparable to P-28 shot. It would also indicate that there is practically no difference as far as the endurance limits obtained are concerned whether, within the limits of the hardnesses used, we use hard or soft shot.

If we refer to the arc heights, which were obtained during the various shot peening operations,

TABLE I

Rockwell C Hardness of Six Lots of Shot

Laboratory	P-28	P-46	Lot 100	Lot 101	Lot 102	Lot 103
Chrysler	63	65	35.5	65	48	27.6
Battelle	63.4	65.1	33.7	59	46.8	25.1

TABLE II

Chemical Analyses of Shot Lots

	P-28	P-46	Lot 100	Lot 101	Lot 102	Lot 103
C	3.14	3.40	.41	3.48	3.50	3.48
Mn	.34	.34	.55	.40	.40	.41
P	.28	.35	.04	.22	.33	.36
S	.133	.198	.069	.184	.151	.135
Cr	...	...	.02	...	...	...
Si	1.33	1.69	.39	2.00	1.48	.94
Ni	.09	.07	.08	...	...	.04

TABLE III

Breakdown or Shot Life Tests

P-16 Shot

Sample No.	9800 rpm arc height inches	9800 rpm av. life cycles	.007 A-2 arc height wheel speed r.p.m.	.007 A-2 arc height av. life cycles
100	.009	488	6500	1133
101	.014	6.9	3750	121
102	.010	53	5000	590
103	.007	135	9800	135

P-28 and P-46 Shot

Size	9800 rpm arc height inches	9800 rpm av. life cycles	3000 rpm arc height inches	3000 rpm av. life cycles
P-28	.027	6.7	.012	235
P-46	...	4.4	.017	109

and compare them with the endurance limits determined for the springs which were peened with the Almen strips, it is readily apparent that in an investigation of this type there is absolutely no correlation between arc height and endurance limit. For example, we found almost exactly the same endurance limit for springs shot peened 15 minutes with P-16 shot, Lot 103, and with P-28 shot for 30 minutes. Arc height with the first lot of springs was 7 and that with the latter 24.2. It would therefore seem that arc height of itself does not mean much unless the shot used is specified as to size and hardness. Even then it would appear to be desirable still to set up a minimum arc height by running fatigue tests and attempting to secure some kind of correlation between arc height and endurance limit for the particular shot in question.

From our data there does not appear to be any tendency to over shot peen using the P-16 shot.

Depth of cold working with different size shot has not been completely worked out. If the larger shot does go deeper, then standards of shot size for various wire sizes should be considered. Also, peening hot wound springs with some ferrite the heavier shot might then be an advantage. It is hoped that these data by x-ray (or other method) can be soon made available to all interested parties.

We know that the softer shot gives us lower maintenance of our equipment. Our tests here in 1939-1940, and reported to A.S.M. in 1941, showed equal fatigue life. These tests confirm the previous runs in that soft shot from an endurance point of view will produce results comparable with the hard shot. It is evident that an economy can be achieved using steel or a heat treated cast iron shot.

At present this will be hard to accomplish because: (1) Inspection departments and some metallurgists use visual means to say whether or not a part is properly shot peened, and (2) government and some company prints often carry an arc height as part of the peening outline. This will have no beneficial effect on the quality that will be received by these agencies but may well determine the kind of shot to be used. Actually, such a specification could lower the quality of the peening. By adding a little oversize shot to the machine it is possible to raise the arc height quickly but not the spring endurance limit which might go less than that anticipated.

After 60 days continuous running using soft shots on valve springs, we have some production figures which indicate to us: (a) One pound of steel shot will equal 6 pounds of white cast iron shot; (b) steel shot cuts repairs to equipment by 50 per cent minimum; (c) steel shot will not remove small burrs or similar grinding imperfections from springs; (d) so-called malleablized white cast iron carries enough white iron shot that breaks into grit to remove said burrs in samples tested; (e) routine fatigue tests on test springs run with valve springs over this period of time averaged slightly higher stress range with steel than when white cast iron shot was used on production work.

TABLE IV

CLASSIFICATION OF SHOT SIZE

Shot Size in Inches	P-16 Lot 100	P-16 Lot 100A	P-16 Lot 101	P-16 Lot 101A	P-16 Lot 102	P-16 Lot 102A	P-16 Lot 103	P-16 Lot 103A	P-28	P-28A	P-46	P-46A
Under .011	0.3	0.6	0.2	81.5	0.1	4.5	0.2	0.2		37.7		16.8
.011-.013	2.1	3.1	1.3	6.7	1.2	2.1	0.7	2.0		21.0		11.5
.013-.016	27.3	39.9	25.6	6.5	24.5	25.3	13.6	27.6		20.5		16.7
.016-.019	67.7	55.2	71.5	4.0	72.6	65.1	80.1	66.5		11.3		19.0
	(a)		(a)		(a)				(c)		(c)	
.019-.023	2.6	1.0	1.4	0.7	1.6	2.6	5.3	3.4	1.0	5.0	1.0	16.9
		(b)		(b)		(b)	(b)	(b)				
.023-.028		0.2		0.6		0.4	0.1	0.3	8.5	3.0	3.2	11.2
										(e)		
.028-.033									89.4	1.5	13.0	5.2
									(d)			
.033-.039									2.1		35.1	1.9
.039-.046											41.2	0.6
.046-.055											6.5	0.2

Note: Values in the Above Table are in Percent.

(a) over .019
(b) over .023
(c) under .023
(d) over .033
(e) over .028

TABLE V

ROCKWELL HARDNESS OF ALMEN STRIPS

Time	P-46	P-28	P-16 Lot 100	P-16 Lot 101	P-16 Lot 102	P-16 Lot 103
2 min. no load belt stationary	38.5	21.5	7.7	9	10	8
5 min. with springs	28.1	20	8	9.2	7.5	4.2
15 min. with springs	38	23.5	7.5	11.7	9	7
30 min. with springs	39	24.2	9.2	12.7	11.5	8.5
120 min. with springs	46.5	26.7	12	15.5	14.7	13
2 min. no load belt stationary after 4 hrs. of running	15	12.5	8	5	10.2	6.7

TABLE VI

TIME OF SHOT PEENING

Shot	5 min.	15 min.	30 min.	120 min.
P-46	13,000-114,000	less than 20,000-115,000	16,750-106,200	11,700-110,500
P-28	14,200-123,600	3,300-110,000	12,600-120,000	10,930-113,750
P-16 Lot 100	13,500-116,000	10,750-118,200	16,000-115,000	over 12,750-120,500
P-16 Lot 101	11,500-122,500	10,000-117,500	10,000-127,500	11,100-120,250
P-16 Lot 102	12,300-123,750	10,750-125,800	13,000-120,500	11,000-119,200
P-16 Lot 103	16,000-122,500	12,200-120,000	10,750-118,000	11,000-121,000

(Endurance limit not shot peened 20,000-95,000)

"Salute to Alloy Steel"

CENTRAL THEME OF

30th NATIONAL METAL CONGRESS

The diamond jubilee of alloy steel will be celebrated at this year's National Metal Congress and Exposition, sponsored by American Society for Metals. To be held in Philadelphia, October 25 to 29, the exposition again has four societies participating, each with an imposing series of papers to be presented at technical sessions. Over 300 exhibitors will display products

SEVENTY-FIVE years of progress made in alloy steel will be the central theme around which the National Metal Congress and Exposition will revolve when the American Society for Metals holds its 30th annual convention in Philadelphia, October 25 to 29. Among the features of the diamond jubilee will be a program of technical and historical papers about alloy steel, presentation of distinguished service awards to individuals who have made outstanding contributions to the progress and development of alloy steels and a dramatization of the part played by alloy steels in the history and development of our country.

The last named feature will include graphic evidence of the dependence of the American economy on alloy steel as well as the progress of this now widely used type of steel in relation to the engineering, research and technology utilized in its development. This exhibit will be on the main stage of Commercial Museum, scene of the exposition.

As was the case last year, the event is sponsored by the American Society for Metals in co-operation with the American Welding Society, the Institute of Metals Division of the American Institute of Mining and Metallurgical Engineers and the Society for Non-Destructive Testing. Society programs are on ensuing pages.

In the 1870's—some 75 years ago—a bridge was designed using a new type steel in its compression members. The Eads bridge over the Mississippi river at St. Louis, designed by Capt. James B. Eads, by using chromium steel main compression members became the first engineering structure to use alloy steels. In the history of alloy steels written by Carl A. Zapffe, Baltimore consulting engineer, for presentation at the Metal Congress, difficulties encountered in rolling and fabricating these hard steels will be described. The history will then go on to trace the rapid development of the various types of engineering alloy steels.

Central motif of the exhibit to visualize the years of progress of alloy steel will be a working replica of an early crucible furnace with an operator demonstrating the pouring of an ingot. Modern practice will be depicted by large illustrations of modern steelmaking furnaces. Industry exhibits will depict the contributions of alloy steels to the development of the essential industries. At intervals each day a story of alloy steel development in each industry will be told by sound-slide films.

Besides the regular technical sessions of the American Society for Metals at which 44 papers will be presented, three educational lecture courses will be presented by the society's educational committee. Subjects of the courses, all of which will be presented in Convention Hall, in late afternoon and evening sessions, are: "Properties of Metals in Materials Engineering", "Grain Control in Industrial Metallurgy" and "Metallurgy and Magnetism".

After the annual meeting, Morris Cohen, professor of physical metallurgy, Massachusetts Institute of Technology, will deliver the Edward deMille Campbell memorial lecture. Dr. Cohen, an authority on heat treatment of high speed steels, is the author of a series of papers on dimensional stability of steels, part four of which will be presented at the ASM technical session on Monday morning, October 25.

A total of over 68 papers will be presented at the various technical sessions of the American Welding Society's 29th annual meeting. Meeting for five days, papers are being presented in three simultaneous sessions on Monday morning, Tuesday and Wednesday morning and afternoon and Thursday and Friday mornings in the Bellevue-Stratford Hotel. An AWS sponsored educational lecture series will be held in Convention Hall on Monday, Tuesday and Wednesday afternoons, the subject being "Metallurgy of Arc Welds in Steel", conducted by Dr. R. D. Stout of Lehigh University.

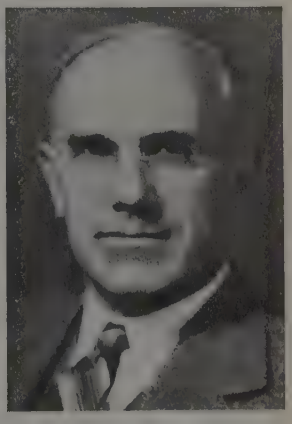
On Monday evening, October 25th, awards of prizes

AND EXPOSITION

FRANCIS B. FOLEY
President, ASM, 1948

DR. HAROLD K. WORK
Vice President and President-Elect, ASM

H. O. HILL
President, AWS, 1947-48



G. N. SIEGER
Vice President and President-Elect, AWS

and medals will be made. The 1947 Samuel Wylie Miller medalist is J. J. Crowe, assistant vice president, Air Reduction Sales Co., Summit, N. J., and the 1948 Lincoln Gold medalist is E. Paul DeGarmo, associate professor of mechanical engineering, University of California, Berkeley, Calif. The 1948 Adams lecturer will be Dr. G. E. Claussen, metallurgist, Reid-Avery Co., Baltimore, who will speak on "Metallurgy of Covered Electrode Weld Metal".

Mr. G. Edward Pendray, counsel on public relations to industrial companies, will be the speaker at the American Welding Society annual dinner on Thursday evening. His subject: "Rockets and Jet Propulsion".

Meeting in Hotel Adelphia Monday through Wednesday is the Institute of Metals Division of the American Institute of Mining and Metallurgical Engineers. A total of 39 papers will be presented at the 10 technical sessions, some of which run simultaneously. Outstanding feature of the program will be a symposium on "Rod and Wire Production Practice" on Tuesday morning, October 26. Chairman of the Institute of Metals is A. A. Smith Jr., of Central Research Laboratories, American Smelting & Refining Co., who will act as toastmaster at the institute's annual autumn dinner on Tuesday evening. He will introduce the speaker, Dr. Waldo E. Fisher, professor of industry, Wharton School, University of Pennsylvania, who will present an appraisal of the Taft-Hartley Act.

Four technical sessions on Wednesday and Thursday, October 27 and 28 are planned for the seventh annual meeting of the Society for Non-Destructive Testing at Hotel Benjamin Franklin. The 1948 Mehl lecture will be presented during the Thursday afternoon session. The lecturer, Dr. Floyd A. Firestone, a consulting physicist of Washington, D. C., will speak on "The Supersonic Reflectoscope, an Instrument for Nondestructive Testing and Measuring by Means of Sound Waves".

At the annual banquet of the American Society for Metals, Dr. Francis C. Frary will be presented the ASM Gold medal for "outstanding metallurgical knowledge and great versatility in the application of science to the metal industry." Dr. Frary, the fourth recipient of the medal, has been associated with the Aluminum Co. of America for 30 years and is the discoverer of Frary metal, a lead alloy for bearings, hardened with calcium and barium.

Also to be presented at the banquet is the ASM medal for the Advancement of Research for 1948. Dr. Williard H. Dow, president of Dow Chemical Co., Midland, Mich., has been elected to receive this medal.

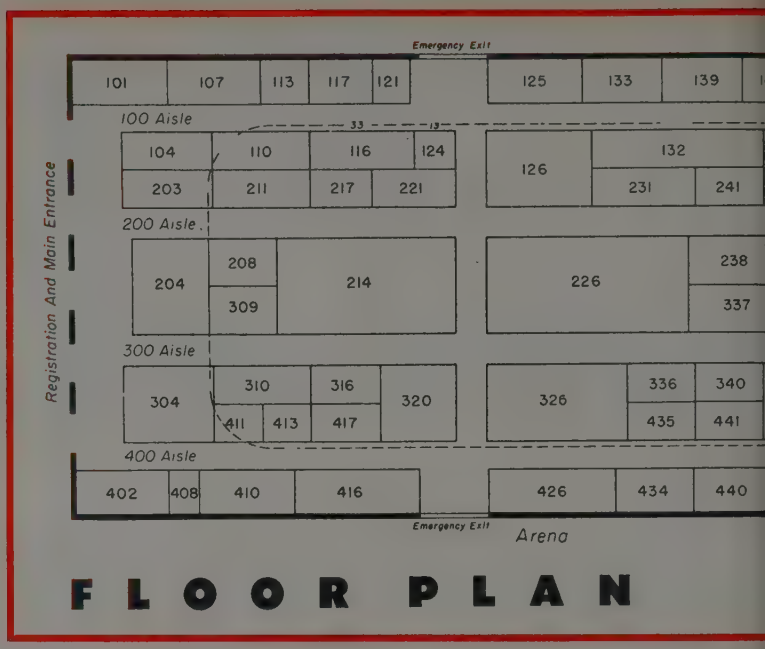
A feature event of the National Metal Congress will be the presentation of distinguished service awards for meritorious contributions to alloy steel progress. These certificates and citations will be presented to living Americans and Canadians in all branches of the field of engineering alloy steels.

Dr. Harold K. Work, manager of research and development of Jones & Laughlin Steel Corp., Pittsburgh, has been nominated for the office of president of the American Society for Metals for the year 1948-49, to succeed Francis B. Foley, Philadelphia, Midvale Corp. executive. Other officers nominated are: Vice president, Dr. A. E. Cooke, Diamond Chain & Mfg. Co., Indianapolis; secretary, W. H. Eisenman; national trustees, Dr. Harry Croft, Chase Brass & Copper Co., Cleveland and F. J. Robbins, Sierra Drawn Steel Corp., Los Angeles.

EXHIBITORS

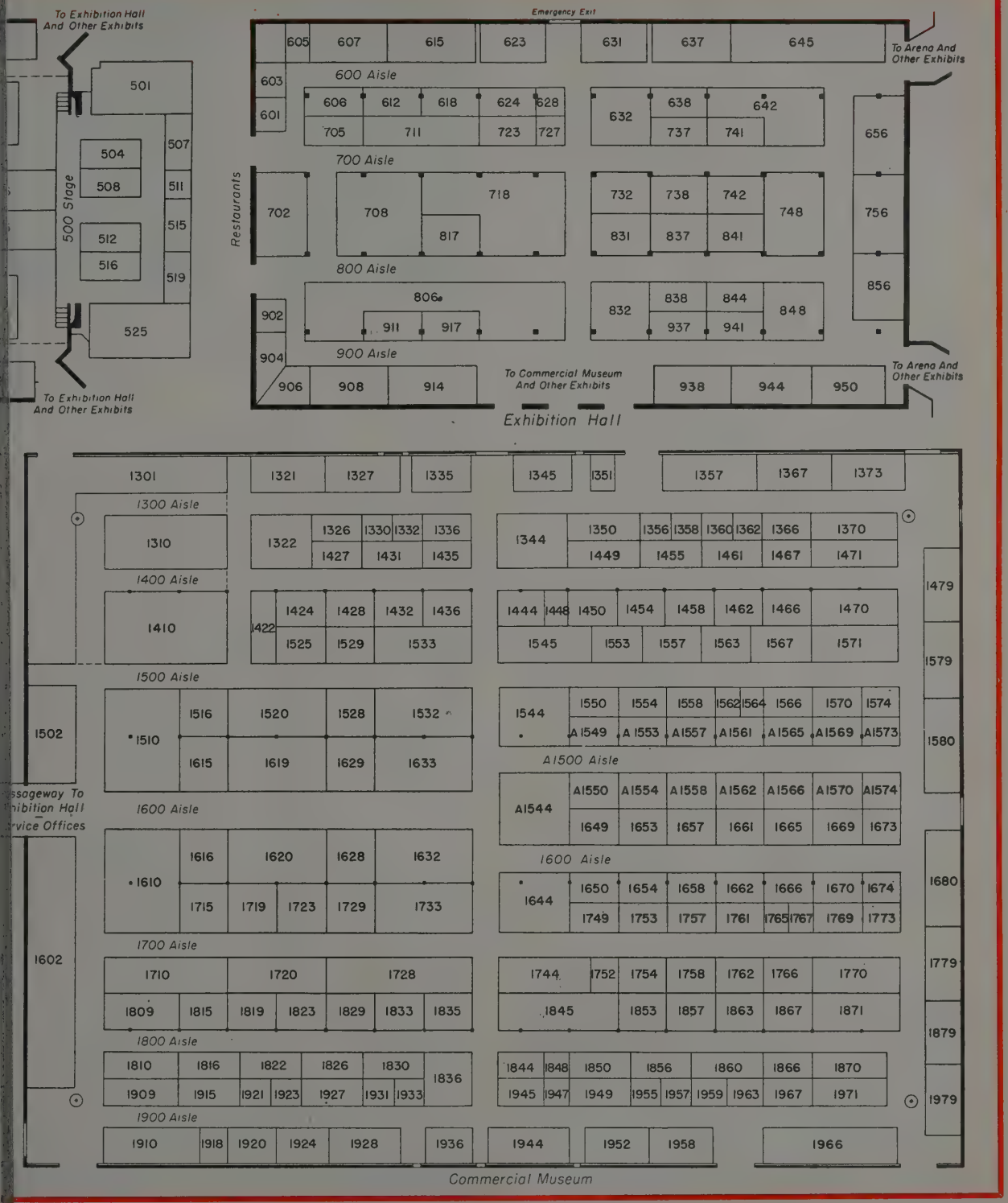
At Commercial Museum and Convention Halls, Philadelphia

Exposition opens at 12 Noon on Monday, Tuesday and Wednesday, October 25 to 27, and closes at 10:30 p.m. On Friday and Saturday, October 28 and 29, the hours are 10:00 a.m. to 6:00 p.m.



FLOOR PLAN

Exhibitors	Space
Acetogen Gas Co.	A-1549
Acme Mfg. Co.	618
Acme Steel Co.	737
Acme Tool Co.	1909
Air Reduction Sales Co.	1845
Ajax Electric Co.	645
Ajax Electrothermic Corp.	645
Ajax Engineering Corp.	645
Alan Wood Steel Co.	1809
Alden Welding Supplies Inc.	A-1567
Allison Co.	705
Alloy Rods Co.	345
Alvey-Ferguson Co.	1819
American Brake Shoe Co. Electro Alloys Division	126
American Brass Co.	337
American Chain & Cable Co. Inc.	116
American Chemical Paint Co.	1654
American Cladmetals Co.	124
American Gas Furnace Co.	1509
American Emblem Co.	1729
American Gas Association	1301
Amer. Inst. of Bolt, Nut & Rivet Mfg. Assn.	1564
American Manganese Steel Co.	126
American Metal Market Co.	1918
American Non-Gran Bronze Corp.	1767
American Smelting & Refining Co. Federated Metals Division	231
Anderson Oil Co., F. E.	1629
Arcos Corp.	144
Army Industrial & Recruiting Display, Frankford Arsenal	1357
Aronson Machine Co.	1963
Arwood Precision Casting Corp.	1427
ASM—Philadelphia Chapter	A-1554
Atkins & Co., E. C.	831
Audubon Wire Cloth Corp.	1545
Austenal Laboratories Inc.	1428
Auto Arc-Weld Mfg. Co.	1765
Automatic Temperature Control Co. Inc.	104
Baker & Co. Inc.	1853
Baldwin Locomotive Works	1620
Bastian-Blessing Co.	1816
Bath & Co., Cyril	1520
Battelle Memorial Institute	1754
Bausch & Lomb Optical Co.	310
Bellis Heat Treating Co.	1356
Bendix-Westinghouse Air Brake Co.	817
Black Drill Co.	656
Blakeslee & Co., G. S.	1762
Brown Instrument Co.	203
Brush Beryllium Co.	906
Bryant Heater Co.	1315
Buehler Ltd.	441
Butler Cylinder Gas Co.	A-1567
By-Products Steel Co.	320
Cambridge Wire Cloth Co.	1424
Campbell Machine Div., Amer. Chain & Cable Co.	116
Carbomatic Corp.	1302
Carlin Co., Inc., J. A.	1657
Cherry Rivet Co.	742
Chilton Co. Automotive Industries	1959
Cincinnati Milling & Grinding Machine Co.	1510
Cities Service Oil Co.	402
Cleveland Punch & Shear Co.	1733
Clinton Machine Co.	1836
Colonial Alloys Co.	1662
Commander Mfg. Co.	941
Commerce Pattern Foundry Machine Co.	1525
Continental Industrial Engineers Inc.	145
Crane Packing Co.	1530
Crystal Lake Grinders	1562
Delaware Tool Steel Corp.	121
Delta File Works	1332
deSanno & Son, A. P.	1362
Despatch Oven Co.	1415
Detroit Mold Engineering Co.	A-1562
Detroit Testing Machine Co.	1830
Dietert Co.	208
Distillation Products Inc. Vacuum Equipment Division	1909
Diversey Corp.	1815
Donovan Co.	844
Dow Chemical Co.	416
Dreis & Krump Mfg. Co.	718
Drever Co.	1653
Drexell Institute of Technology	A-1558
Driver Co., Wilbur B.	1810
du Pont de Nemours & Co., E. I.	1665
East Shore Machine Products Co.	756
Ecco High Frequency Corp.	1467
Eclipse Fuel Engineering Co.	1410
Edgecomb Steel Co.	109
Electric Furnace Co.	221
Electric Hotpack Co. Inc.	1763
Elge Associates	1454
Engelhard Inc., Charles	A-1561
Eutectic Welding Alloys Corp.	1633
Fansteel Metallurgical Corp.	101
Ferner Co., R. Y.	1927
Finishing Publications Inc.	603
Foote Mineral Co.	1554
Fostoria Pressed Steel Corp.	1558
FOUNDRY, The	1744
Frontier Bronze Corp.	316
Gamma Scientific Co.	A-1563
Gardner Publications	1345
Gas Appliance Service	1310
Gehnrich & Gehnrich Inc.	1307
General Alloys Co.	204
General Controls Co.	1346
General Electric X-Ray Corp.	246
Goodrich Co., B. F.	638
Griffith-Raguse & Co. Inc.	1657
Gulf Oil Corp.	1616
H. & H. Research Co.	1909
Hamilton Mfg. Co.	1576
Handy & Harman	132
Hanson-Van Winkle-Munning Co.	607
Harnischfeger Corp.	1728
Harper Electric Furnace Corp.	605
Harvey Machine Co. Inc.	1449
Hauck Mfg. Co.	1326
Hayes Inc., C. I.	1557
Haynes Stellite Co.	1602
Heli-Coil Corp.	1330
Hobart Brothers Co.	944
Hones Inc., Charles A.	1304
Houghton & Co., E. F.	832
Hunter Spring Co.	1666
Illinois Testing Laboratories Inc.	1431
Industrial Press Machinery	1860
Industrial Publishing Co.	440
International Nickel Co.	226
International Tin Research Institute	1325
Invincible Vacuum Cleaner Mfg. Co.	1566
Iron Age	410
Jaekson Buff Corp.	1710
Jackson Products	1933
Janney Cylinder Co.	1450
Jarrell Ash Co.	1761
Jelliff Mfg. Corp., C. O.	1850
Joseph, E. R.	A-1567
K-E Industries	1929
Kalamazoo Tank & Silo Co.	1462
Kanthal Co., A. B.	1850
Keen Compressed Gas	A-1567
Kemp Mfg. Co., C. M.	1318
Kent Co. Inc.	1957
King, Andrew	411
Kropp Forge Co.	848
Krouse Testing Machine Co.	133
Kux Machine Co.	908
Leeds & Northrup Co.	1910
Lepel High Frequency Laboratory	1749
Libert Machine Co.	718
Lincoln Electric Co.	1645
Lindberg Engineering Co.	344
Linde Air Products	1602
Lipe Rollway Corp.	A-1546
Liquid Carbonic Wall Chemical Division	1931
Lithium Co.	1409
Lobdell Co.	1856
Los Angeles Chamber of Commerce	1344
Los Angeles Dept. of Water & Power	
Southern California Edison	
Southern California Gas Co.	
Lukens Steel Co. Lukenweld Division	320
Lynch Machinery Co., Edw. A.	718
MACHINE DESIGN	1744
Machinery & Welder Corp.	1553
Magnaflux Corp.	723
Magnetic Analysis Corp.	1826
Mallory & Co. Inc., P. R.	637
Manganese Steel Forge Co.	1545
McCracken & Sons Inc., R. S.	A-1567
McGraw-Hill Publishing Co. Inc. Welding Engineer	1844
McKay Co.	1833
Meehanite Metal Corp.	1610
Merrill Brothers Inc.	A-1553
Metal & Thermit Corp.	426
Metal Finishing Service	1924
Metal Progress (Publ.)	241
Metallizing Co. of America	741
Metals Review (Publ.)	241
Metals Disintegrating Co. Inc.	937
Metlab Co.	113
Michiana Products Corp.	1650
Michigan Steel Casting Co.	914
Micro Metallic Corp.	1664
Midvale Co.	238
Milne & Co., A.	1366
Milton Equipment Co.	1715
Minneapolis-Honeywell Regulator Co.	203
Morton Gregory Corp.	856
Motch & Merryweather Machinery Co.	642
National Bronze & Aluminum Foundry	902
National Carbon Co.	1602
National Diamond Hone & Wheel Co.	1848
National Industrial Publishing Co. Industrial Heating Industry and Welding	1533
National Lead Co.	1915
National Radiator Co. Plastic Metals Division	606
National Research Corp.	601
Navy Dept. Naval Gun Factory U. S. Naval Eng. Experiment Station	1952
Nelson Stud Welding	856
NEW EQUIPMENT DIGEST	1744
New Jersey Zinc Co.	326
Niagara Blower Co.	A-1544
North American Phillips Co.	147
Northwestern Tool & Engineering Co.	1360
Ohio Crankshaft Co.	304
Ohio Seamless Tube Co.	623
Olsen Testing Machine Co.	1529
Optimus Equipment Co.	612
Osborn Mfg. Co.	631
Packer Machine Co.	1710
Pangborn Corp.	841
Park Chemical Co.	340
Parker-Kalon Corp.	1949
Partlow Corp.	1936
Penton Publishing Co.	1744
Pereny Equipment Co.	1752
Philadelphia Electric Co.	1857
Phillips Mfg. Co.	711
Physicists Research Co.	125
Poole, C. A.	1755
Porter-McLeod Machine Co.	1921
Precision Shapes Inc.	A-1557
Precision Welder & Machine Co.	624
Production Machine Co.	1327
Pyrometer Instrument Co. Inc.	727
Quigley Co. Inc.	738
Radio Corp. of America	110
Ransburg Electro-Coating Corp.	1544
Ransome Machine Co.	1628
Raybestos-Manhattan Inc. Manhattan Rubber Division	1550
Reed Engineering Co.	718, 1858
Reeves Pulley Co.	1435
Reinhold Publishing Corp. Materials and Methods	107
Revere Copper & Brass	702
Reynolds Metals Co.	1632
Richards Co., J. A.	628
Riverside Metal Co.	1758
Rolock Inc.	1432
Safety Clothing & Equipment Co.	837
Salkover Metal Processing	A-1559
Sargeant & Wilbur Inc.	1537
Scherr Co. Inc., George	417
Schrader's Son, A.	1835
Sciaky Bros. Inc.	1619
Scott & Son Inc., C. U.	408
Scoville Mfg. Co.	950
Selas Corp. of America	1401
Sentry Co.	413
Shell Oil Co. Inc.	1823
Simonds Saw & Steel Co.	1822
Simonski, Gilbert S.	1351
Snap-On Tools Corp.	1955



Socony-Vacuum Oil Co. Inc...	1720	Tabor Mfg. Co.	A-1565	Tinnerman Products	336	Vascoloy-Ramet Corp.	101
South Bend Lathe Works	1866	Taco West Corp.	904	Torit Mfg. Co.	760	Webb Corp.	718
Spencer Turbine Co.	217	Tatnall-Young Testing Machine		Torrington Mfg. Co.	632	Welders Supply	A-1567
Sperry Products Inc.	139	Corp.	104	Tri-Clover Machine Co.	1923	Wells Inc., Martin	1455
Stearns-Roger Mfg. Co.	1321	Taylor-Winfield Corp.	1532	Udylite Corp.	214	Wells Mfg. Co.	1661
STEEL	1744	Technical Publishing Co.	440	Union Carbide & Carbon Co.	1602	Westinghouse Electric Corp. ..	806
Stokes Machine Co., F. J.	1920	Tempil Corp.	309	U. S. Hoffman Machinery Corp.	838	Whistler & Son Inc., S. B.....	1502
Stoody Co.	938	Temple University	A-1550	U. S. Naval Eng. Experiment		Whiting Corp.	718
Stuart Oil Co. Ltd., D. A.....	211	Tennant Co., G. H.	1336	Station	1952	Willys-Overland Motors Inc...	1644
Sun Oil Co.	615	Texas Co.	1563	Upton Electric Furnace Div....	1525	Wilson Mechanical Instrument	
Superior Tube Co.	1829	Tide Water Associated Oil Co.	1436	Vanadium Corp. of America..	117	Co. Inc.	116
Surface Combustion Corp. ...	1416	Timken Roller Bearing Co.....	445	Vapor Blast Mfg. Co.....	1967		

PROGRAM

All Sessions at Hotel Benjamin Franklin, Oct. 27 and 28

MONDAY, OCT. 25

9:30 a.m.—Heat Treatment Session
Ballroom, Benjamin Franklin Hotel

"Isothermal Decomposition of Martensite and Retained Austenite," by B. L. Averbach, assistant professor of metallurgy, and Morris Cohen, professor of physical metallurgy, Massachusetts Institute of Technology.

"Dimensional Stability of Steel—Part IV—Tool Steels," by B. S. Lement, member of staff, department of metallurgy, B. L. Averbach, and Morris Cohen, Massachusetts Institute of Technology.

"Transformation and Retention of Austenite in SAE 5140, 2340 and T 1340 Steels of Comparable Hardenability," by A. R. Troiano, professor of metallurgy, University of Notre Dame.

"Microstructure of Low Carbon Steel," by R. L. Rickett, assistant supervisor, physical metallurgy section, and F. C. Kristufek, Research Laboratories, United States Steel Corp.

2:00 p.m.—Heat Treatment Session
Ballroom, Convention Hall

"Influence of Ni and Mo on Isothermal Transformation of Austenite in Pure Fe-Ni-Mo Alloys Containing 0.55 Carbon," by D. A. Scott, instructor in physical metallurgy, W. M. Armstrong, associate professor of physical metallurgy, and F. A. Forward, professor and head, department of mining and metallurgy, University of British Columbia.

"Transformation Characteristics of Ten Selected Nickel Steels," by J. P. Sheehan, associate metallurgist, Armour Research Foundation, C. A. Julien, patent adviser, Naval Research Laboratory, and A. R. Troiano, professor of metallurgy, University of Notre Dame.

"Metallography and Heat Treatment of 8-10% Nickel Steel," by G. R. Brophy, metallurgist in charge of steel research, and A. J. Miller, metallurgist, International Nickel Co.

"Predicting the Effect of Complex Tempering Cycles," by J. L. Waisman, metallurgist, Douglas Aircraft Co., and W. T. Snyder, chief engineer, Herff Jones Co.

TUESDAY, OCT. 26

9:30 a.m.—Steel Ingots Session
Ballroom, Benjamin Franklin Hotel

"Distribution of Nonmetallic Inclusions in Some Killed Alloy Steel Ingots," by K. L. Fetters, special metallurgical engineer, Youngstown Sheet & Tube Co., M. M. Helzel, analytical chemist, and J. W. Spretnak, member of staff, Metals Research Laboratory, Carnegie Institute of Technology.

"Some Factors Affecting Subsurface Defects in Large Forging Steel Ingots," by E. A. Loria, fellow, Mellon Institute of Industrial Research, and H. D. Shephard, metallurgical engineer, Kerchner, Marshall & Co.

"Density Variations in Some Killed Steel Ingots," by C. F. Sawyer, plant metallurgist, Vanadium-Alloys Steel Co., and J. W. Spretnak, member of staff, Metals Research Laboratory, Carnegie Institute of Technology.

"Nature of Inclusions in Tensile Fractures of Forging Steels," by H. D. Shephard, metallurgical engineer, Kerchner, Marshall & Co., and E. A. Loria, fellow, Mellon Institute of Industrial Research.

9:30 a.m.—Nonferrous Alloys Session
Betsy Ross Room, Benjamin Franklin Hotel

"Fractographic Examination of Tungsten," by C. A. Zapffe and F. K. Landgraf, consultants, Baltimore.

"Effect of Orientation on Knoop Hardness of Single Crystals of Zinc and Silicon Ferrite," by F. W. Daniels, Metals Section Laboratory, and C. G. Dunn, research physicist, General Electric Co.

"Effect of Single Addition Metals on the Recrystallization, Electrical Conductivity and Rupture Strength of Pure Aluminum," by R. H. Harrington, research metallurgist, General Electric Co.

"Forming and Heat Treatment of Corrugated Diaphragms," by R. I. Jaffee, E. I. Beidler and R. H. Ramsey, Battelle Memorial Institute.

DR. WILLARD H. DOW
President, Dow Chemical Co., recipient of ASM Medal for Advancement of Research

DR. FRANCIS C. FRARY
Director of Research, Aluminum Co. of America, 1948 ASM Gold Medal Winner

2:00 p.m.—Mechanical Properties Session
Ballroom, Convention Hall

"Microstructure and Mechanical Properties of Cast Steels," by M. F. Hawkes, assistant professor of metallurgical engineering and member of staff, Metals Research Laboratory, and B. F. Brown, graduate student, Carnegie Institute of Technology.

"Effect of Vanadium on the Properties of Cast Carbon and Carbon-Molybdenum Steels," by N. A. Ziegler, research metallurgist, W. L. Meinhart, assistant research metallurgist, and J. R. Goldsmith, metallurgical engineer in charge of research foundry, Crane Co.

"Mechanical Properties, Including Fatigue, of Aircraft Alloys at Very Low Temperatures," by J. L. Zambrow, research engineer, and M. G. Fontana, professor and chairman, department of metallurgy, Ohio State University.

"Influence of Low Temperature on the Mechanical Properties of 18-8 Chromium-Nickel Steel," by D. J. McAdam, Jr., metallurgist, G. W. Geil, metallurgist, and Frances Jane Cromwell, metallurgist, National Bureau of Standards.

WEDNESDAY, OCT. 27

10:00 a.m.—ASM Annual Meeting
Ballroom, Benjamin Franklin Hotel

Edward deMille Campbell Memorial Lecture, by Morris Cohen, professor of physical metallurgy, Massachusetts Institute of Technology.

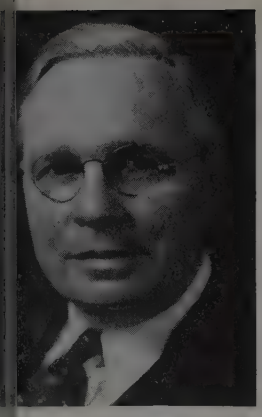
2:00 p.m.—Engineering Properties Session
Ballroom, Convention Hall

"Basic Reasons for Good Machinability of 'Free Machining' Steels," by M. Eugene Merchant, physicist, and M. Zlatin, research engineer, Cincinnati Milling Machine Co.

"An End Quenched Bar for Deep Hardening Steels," by Gerrit deVriest, metallurgist, U. S. Naval Proving Ground

"Transverse Mechanical Properties in Heat Treated Wrought Steel Products," by Cyril Wells, Metals Research Laboratory, and R. F. Mehl, director, Metals Research Laboratory, Carnegie Institute of Technology

"Residual Stresses and Microstructure in Hollow Cylinders," by H. B. Wishart, chief development metallurgist, and R. K. Potter, metallurgical inspector, Carnegie-Illinois Steel Corp.



J. J. CROWE
sistant Vice President, Air Re-ction Sales Co., to receive muel Wylie Miller Memorial Medal, AWS

E. PAUL DEGARMO
Associate Professor of Mechanical Engineering, University of California, 1948 Lincoln Gold Medallist, AWS

THURSDAY, OCT. 28

9:30 a.m.—Stainless Steels Session

Ballroom, Convention Hall

"Resistance to Sensitization of Austenitic Chromium-Nickel Steels of 0.03 Max. Carbon Content," by O. W. Binder, metallurgist and C. M. Brown, metallurgist, Union Carbide & Carbon Research Laboratories, and Russell Franks, chief metallurgist, Electro Metallurgical Co.

"Mechanism of the Rapid Oxidation of High-Temperature, High-Strength Alloys Containing Molybdenum," by W. C. Leslie, research fellow, and M. G. Fontana, professor and chairman, department of metallurgy, Ohio State University

"Stabilization of Austenitic Stainless Steel," by Samuel J. Rosenberg, senior metallurgist, and John H. Darr, scientific aid, National Bureau of Standards

"Delta Ferrite Formation and Its Influence on the Formation of Sigma Phase in a Wrought Heat Resisting Steel," by John J. Gilman, instructor in metallurgical engineering, Illinois Institute of Technology, Pun Kien Koh, research metallurgist, Allegheny Ludlum Steel Corp., and Otto Zmeskal, director, department of metallurgical engineering, Illinois Institute of Technology

9:30 a.m.—Nonferrous Alloys Session

Room 300, Convention Hall

"Indium-Bismuth Phase Diagram," by E. A. Peretti, associate professor of metallurgy, and S. C. Carapells, Jr., teaching fellow, department of metallurgy, University of Notre Dame

"Manganese-Zinc Phase Diagram from 0-50% Zinc," by E. V. Potter, electronics engineer, U. S. Navy Electronics Lab., and R. W. Huber, Bureau of Mines, U. S. Dept. of Interior

"Dilatometric Effects of Hardening and Recrystallization in the 60 Copper-20 Nickel-20 Manganese Alloy," by C. H. Samans, chief, metallurgical section, Research Laboratory, C. C. Brayton, technical assistant, H. L. Drake, technical assistant, and L. Litchfield, technical assistant, American Optical Co.

"Beta Laminations in Cartridge Brass," by Ralph L. Dowdell, head, Department of Metallurgy, University of Minnesota, Charles A. Nagler, associate professor, physical metallurgy, Wayne University, Morris E. Fine, member technical staff, Bell Telephone Labs., Harold P. Klug, head, department of research in chemical physics, Mellon Institute of Industrial Research, and Gust Bitsianes, instructor in metallurgy, University of Minnesota

2:00 p.m.—High Temperature Alloys Session

Ballroom, Convention Hall

"Aging in Gas Turbine Type Alloys," by Nicholas J. Grant, associate professor of metallurgy, and J. R. Lane, research assistant, Massachusetts Institute of Technology

"Nickel-Base Alloys for High Temperature Applications," by A. G. Guy, associate professor of mechanical engineering, North Carolina State College

"Short-Time High Temperature Deformation Characteristics of Several Sheet Alloys," by James Miller and Glen Guarnieri, research metallurgist, Cornell Aeronautical Laboratory

"Stability of Steels at Elevated Temperatures," by A. B. Wilder, chief metallurgist, Pittsburgh Works, and J. O. Light, chief metallurgist, Lorain Works, National Tube Co.

Educational Lecture Series

PROPERTIES OF METALS IN MATERIALS ENGINEERING

MONDAY, OCTOBER 25, 4:15 P.M.

"Introduction," by R. L. Templin, Assistant Director of Research and Chief Engineer of Tests, Aluminum Company of America.

"Fundamental Concepts," by Max Gensamer, Assistant to Director of Research, Carnegie-Illinois Steel Corp.

8:00 P.M.

"Properties of Metals Under Direct or Non-Reserved Loading," by John R. Low Jr., General Electric Laboratories.

"Application of Fatigue Data to the Machine Design," by R. E. Peterson, Manager, Mechanics Dept., Westinghouse Research Labs.

TUESDAY, OCTOBER 26, 4:15 P.M.

"Determination of the State of Stress (Instrumentation)," by W. M. Murray, Massachusetts Institute of Technology.

"Analysis of Stress in Aircraft Engines," by W. T. Bean Jr., Continental Aviation Corp.

7:30 P.M.

"Testing to Specific Deflections (Buckling)," by E. C. Hartmann, Chief, Engineering Design Div., Aluminum Research Lab.

"Design for Energy Absorption," by Wendell P. Roop, Research Consultant, Structural Res. Lab., Swarthmore College.

GRAIN CONTROL IN METALLURGY

TUESDAY, OCTOBER 26, 8:30 P.M.

"Fundamentals of Grain Growth and Recrystallization," by J. E. Burke, Institute for the Study of Metals, University of Chicago.

WEDNESDAY, OCTOBER 27, 4:15 P.M.

"Recrystallization in Iron and Iron Alloys with Suitable Reference to Practice," by R. L. Kenyon, associate director, Research Laboratories, Armco Steel Corp.

8:00 P.M.

"Working and Grain Control in the Copper Base Industry," by H. L. Burghoff, Research Metallurgist, Chase Brass & Copper Co.

THURSDAY, OCTOBER 28, 4:15 P.M.

"Grain Control in the Light Metal Industry," by J. T. Hobbs, Aluminum Research Laboratories.

METALLURGY AND MAGNETISM

MONDAY, TUESDAY, AND WEDNESDAY, OCT. 25, 26, 27, 5:15 P.M.

By J. K. Stanley, Magnetic Department, Westinghouse Electric Corp.

1. Magnetic Theory and Definitions
2. Metallurgical Factors Affecting Magnetic Quality
3. Types and Uses of Ferromagnetic Materials
4. Magnetic Analysis As A Metallurgical Tool

FRIDAY, OCT. 29

9:30 a.m.—Physics of Metals Session

Ballroom, Convention Hall

"Application of the Theory of Diffusion to the Formation of Alloys in Powder Metallurgy," by Pol Duwez, associate professor of mechanical engineering and chief of Materials Section of Jet Propulsion Laboratory, and Charles B. Jordan, research engineer, Jet Propulsion Laboratory, California Institute of Technology

"Thermodynamics in the Decarburization of Steel with Mill Scale," by W. A. Pennington, chief chemist and metallurgist, Carrier Corp.

"Cause and Cure of Inverse Chill and Hard Spots in Cast Iron," by C. A. Zapffe and R. L. Phebus, consultants, Baltimore

"Some Wetting Properties of Metal Powders," by Bernard Kopelman, section head of basic metallurgical research, and C. C. Gregg, Metallurgical Research and Development Laboratory, Sylvania Electric Products, Inc.

2:00 p.m.—Testing Session

Ballroom, Convention Hall

"A Versatile Vacuum-Fusion Apparatus," by Manley W. Mallett, research engineer, Battelle Memorial Institute

"Abrasion Resistance of Metals," by R. D. Haworth, Jr., supervisor, Abrasion Research, Armour Research Foundation

"Solder Flow Tester for Tin Plate," by J. J. Sperotto, General Research Laboratories, American Can Co.

"Nature and Detection of Grinding Burn in Steel," by L. P. Tarasov, metallurgical engineer, and C. O. Lundberg, assistant metallurgical engineer, Norton Co.

American Welding Society

Twenty-Ninth Annual Meeting

All Sessions at Bellevue-Stratford Hotel, Oct. 24-29

SUNDAY, OCT. 24

5 to 7 p.m.—President's Reception

Burgundy Room

MONDAY, MORNING, OCT. 25—9:30 A.M.
THREE SIMULTANEOUS SESSIONS

Ship Design

South Garden

Chairman: H. W. Pierce, New York Shipbuilding Corp.
Co-Chairman: R. L. Deily, Bethlehem Steel Co.

"New Factors to be Considered in Design and Welding of Ships," by Milton Forman, Battelle Memorial Institute

"Riveted vs. Welded Structures," by E. M. MacCutcheon, David Taylor Model Basin, U.S.N.

"Repair of Welded Ships," by L. E. Bledsoe, Newport News Shipbuilding & Drydock Co.

"Evaluation of Effects of Residual Stresses," by T. W. Greene, The Linde Air Products Co.

Railroads

North Garden

Chairman: J. W. Sheffer, American Car & Foundry Co.
Co-Chairman: A. J. Raymo, The Baldwin Locomotive Works

"Submerged-Arc Welding of Box and Hopper Cars," by E. A. Watson, American Car & Foundry Co.

"Welding the Modern Diesel Locomotive," by H. S. Swan, American Locomotive Co.

"General Welding Practices in Locomotive and Car Shops," by J. Michne, New York Central System

Storage Tanks, Pressure Vessels & Piping

Rose Garden

Chairman: A. C. Weigel, Combustion Engineering Co.
Co-Chairman: E. B. Stolle, Midwest Piping & Supply Co.

"Field Erected Storage Tanks of Aluminum," by Fred L. Plummer, Hammond Iron Works

"Sampling of Welds by Trepanning and Allied Methods," by R. B. Lincoln, Pittsburgh Testing Laboratory

"Pipe Welding," by John H. Zink, Heat & Power Corp.

"Effect of Fabrication Processes on Steels Used in Pressure Vessels," by C. J. Osborn, A. F. Scotchbrook, R. D. Stout and B. G. Johnston, Lehigh University

MONDAY AFTERNOON, 4:30 to 6:00 P.M.

Educational Lecture Series

Convention Hall

Chairman: Dr. G. E. Doan, Lehigh University

"Metallurgy of Arc Welds in Steel," by R. D. Stout, Lehigh University

MONDAY EVENING—8:00 P.M.

Rose Garden

Chairman: H. O. Hill, President, American Welding Society
Co-Chairman: E. V. David, Chairman, Convention Committee

Awards of Prizes and Medals, Adams Lecture: "Metallurgy of Covered Electrode Weld Metal," by G. E. Claussen, Reid-Avery Co.

TUESDAY MORNING, OCT. 26th, 9:30 A.M.
THREE SIMULTANEOUS SESSIONS

Symposium on Ship Structure Research

South Garden

Chairman: Captain L. V. Honsinger, U.S.N., Chairman, Ship Structures Committee
Co-Chairman: J. Lyell Wilson, American Bureau of Shipping

"Explosion Tests," by G. S. Mikhalapov, Air Reduction Sales Co.

"Fracture Characteristics of Ship Plate in Certain Small Scale Tests," by E. P. Klier, F. C. Wagner, and M. Gensamer, Pennsylvania State College

"Axial Tension Impact Tests of Structural Steel," by W. H. Bruckner and N. M. Newmark, University of Illinois

Railroad

North Garden

Chairman: A. G. Oehler, Railway Mechanical Engineer
Co-Chairman: L. E. Grant, Chicago, Milwaukee, St. Paul & Pacific R.R. Co.

"Diesel Locomotive Welding," by R. L. Rex, Air Reduction Sales Co.

"Submerged Melt and Inert Gas Shielded Electric Welding Applied to Railroad Cars," by C. R. Strutz, The Oxweld Railroad Service Co.

"Welding Practice in Welding AISI Specification 430 (18% Chrome Steel) in Locomotive Fire Box Applications," by Howard L. Miller, Republic Steel Corp.

High Alloys—Non Ferrous

Rose Garden

Chairman: O. B. J. Fraser, The International Nickel Co.
Co-Chairman: R. H. Aborn, United States Steel Corp.

"Effect of Weld Metal Composition on the Strength and Ductility of 15% Cr-35% Ni Welds," by David Rozet, Hallock C. Campbell and R. David Thomas, Jr., Arcos Corp.

"Use of Alloy and Welding in High Temperature Service in Oil and Gas Processing," by M. E. Holmberg, Phillips Petroleum Company

"Stress Corrosion in Naval Brass," by Bela Ronay, U. S. Navy Engrg. Experiment Station

"Effect of Residual Compression on the Fatigue of Notched Aluminum Alloys," by D. Rosenthal, G. Sines, and G. Zizicas, University of California

TUESDAY AFTERNOON, 2:00 P.M.
THREE SIMULTANEOUS SESSIONS
Tuesday Afternoon, 2:00 P.M.
Symposium on Ship Structure Research

South Garden

Chairman: Commander R. D. Schmidtman, U. S. Coast Guard
Co-Chairman: Finn Jonassen, National Research Council

"Development of Weldable High Strength Steels," by C. E. Sims, H. M. Banta, Battelle Memorial Institute

"Effects of Geometry and Welding on the Transition Temperatures of High Yield Strength Structural Steels," by A. Boodberg and Earl R. Parker, University of California

"Evaluation of Notch Sensitivity Characteristics of Steel by Tear Test Method and Its Application to Quality Control of Ship Plate," by Noah A. Kahn and Emil A. Imbembo, New York Navy Yard

Brazing and Metallizing

North Garden

Chairman: J. R. Wirt, Delco-Remy Division, GMC

Co-Chairman: G. W. Oxley, Standard Oil Development Co.

"Low Temperature Silver Alloy Brazing Copper Beryllium Alloys," by A. M. Setapen and W. D. Warren, Handy & Harman

"Metallizing as a Production Process," by Knowles B. Smith, Dix Engineering Co.

Cutting

Rose Garden

Chairman: H. B. Seydel, Air Reduction Sales Co.
Co-Chairman: E. R. McClung, Lukenweld Inc.

"Powder Cutting and Scarfing in the Steel Industry," by Frank A. Snyder, Carnegie-Illinois Steel Corp.

"A Method of Controlling Cutting Tip Clearance," by R. B. Steele and H. G. Hughey, Air Reduction Sales Co.

"Stability of Oxyacetylene Flames," by L. D. Conta, Air Reduction Sales Co.

TUESDAY AFTERNOON—2:00 P.M.

Open Meeting—Railroad Committee

Burgundy Room

TUESDAY AFTERNOON, 4:30 to 6:00 P.M.

Educational Lecture Series

Convention Hall

Chairman: Dr. W. F. Hess, Rensselaer Polytechnic Institute

"Metallurgy of Arc Welds in Steel," by Dr. R. D. Stout, Lehigh University

WEDNESDAY MORNING, OCT. 27th—9:30 A.M.
THREE SIMULTANEOUS SESSIONS

Weldability

Rose Garden

Chairman: Clarence E. Jackson, Union Carbide and Carbon Research Labs., Inc.
Co-Chairman: R. E. Somers, Bethlehem Steel Co.

"Strain Aging in Welding Low Carbon Structural Steel," by W. H. Bruckner and W. E. Ellis, University of Illinois

"The Influence of Chemical Composition on the Performance of Welded Plates Subject to Concentrated Stress," by J. Heuschkel, Westinghouse Electric Corp., Research Labs., Welding Section

"Notch Toughness of a Variety of Welded Low Carbon Steels," by Dr. E. F. Nippes, Jr., and Warren F. Savage, Rensselaer Polytechnic Institute

"Weldability of Cast Carbon and Alloy Steels," by Sidney Low and V. T. Malcolm, The Chapman Valve Mfg. Co.

Arcs and Electrodes

North Garden

Chairman: J. H. Deppeler, Metal & Thermit Corp.
Co-Chairman: J. H. Humberstone, Arcrods Corp.

"Arc Phenomena with Electrodes Moving at High Speeds," by W. B. Kouwenhoven, Dean of School of Engineering, and T. B. Jones, Asst. Prof. E.E., Johns Hopkins University

"An Investigation of Methods for Evaluating Welding Arc Stability and Their Application," by Prof. R. A. Wyant, Dr. Lauriston P. Winsor, and L. M. Schetky, Rensselaer Polytechnic Institute

"Comparative Behavior of Mild Steel Welds Made with E 6010 and E 6016 Electrodes," by F. W. Daniels, F. S. Gardner, and R. M. Rood, General Electric Co.

Resistance Welding

South Garden

Chairman: G. N. Sieger, S.M.S. Corp.
Co-Chairman: K. W. Ostrom, K. Wm. Ostrom & Co.

"Resistance Welding Characteristics of the Dry Disc Rectifier Welder," by R. H. Blair and C. E. Smith, The Taylor-Winfield Corp.

"Importance of Temperature Measurements in Establishment of Optimum Flash Welding Conditions," by R. M. Curran, P. Patriarca and W. F. Hess, Rensselaer Polytechnic Institute

"Resistance Welding Cross Wires," by R. C. Jones, The Taylor-Winfield Corp.

"Preliminary Test of Spot Weld Shunting in 24 ST Alclad," by A. R. Hard, State College of Washington

WEDNESDAY AFTERNOON, 2:00 P.M.
THREE SIMULTANEOUS SESSIONS

Cutting

North Garden

Chairman: A. B. Gordon, The Linde Air Products Co.
Co-Chairman: R. D. Thomas, Arcos Corp.

A. A. SMITH JR.
Central Research Laboratories, American Smelting & Refining Co., chairman, Institute of Metals Division, AIME

MORRIS COHEN
Professor of Physical Metallurgy, Massachusetts Institute of Technology, to deliver Edward deMille Campbell Memorial Lecture, ASM

"Specialized Steel Mill Cutting Machines and Controls," by R. F. Helmkamp and A. H. Yoch, Air Reduction Sales Co.

"Corrosion Resistance of Powder-Cut Stainless Steels," by L. E. Stark and C. R. Bishop, Union Carbide and Carbon Res. Labs., Inc.

"Structural I-Beam Cut-Off Machine," by G. J. Strate, Air Reduction Sales Co.

Inert-Gas-Shielded Arc Welding

Rose Garden

Chairman: H. E. Rockfeller, The Linde Air Products Co.
Co-Chairman: Walter Mehl, Heintz Manufacturing Co.

"Effect of DC Component in AC Inert-Gas Arc Welding of Aluminum," by G. J. Gibson and G. R. Rothschild, Air Reduction Sales Co.

"Design Features of Inert-Gas-Shielded Arc Welding and Control Equipment," by N. E. Anderson, Air Reduction Sales Co.

"Effect of Wave Shape in Inert-Arc Welding Circuits," by R. W. Tuthill, General Electric Co.

Resistance Welding

South Garden

Chairman: O. C. Frederick, General Electric Co.
Co-Chairman: B. L. Wise, National Electric Welding Machine Co.

"Thermal Resistance of Metal Contacts," by W. B. Kouwenhoven, Dean of School of Engineering, and J. H. Potter, Asst. Prof. M. E., The Johns Hopkins University

"Projection Welding," by Wendell F. Hess, Rensselaer Polytechnic Institute

"Spotwelding Schedules for Nickel Alloys," by F. G. Harkins, Solar Aircraft Company

WEDNESDAY AFTERNOON, 4:30 to 6:00 P.M.

Educational Lecture Series

Convention Hall

Chairman: Dr. Finn Jonassen, National Research Council

"Metallurgy of Arc Welds in Steel," by R. D. Stout, Lehigh University

WEDNESDAY EVENING—8:00 P.M.

Section Officers Conference

Clover Room

University Conference

Green Room

THURSDAY MORNING, OCT. 28th, 9:30 A.M.
THREE SIMULTANEOUS SESSIONS

Structural

Rose Garden

Chairman: W. E. Hendricks, Belmont Iron Works
Co-Chairman: Van Rensselaer P. Saxe, Consulting Engineer

"Welded Bridges," by LaMotte Grover, Air Reduction Sales Co.

"Fabrication of Structural Steel Sections by Submerged Melt Welding," by J. W. Tippett, The Linde Air Products Co.
"Flexible Beam and Girder Connections in a Large Welded Structure," by Harry Greaves, The Atlantic Refining Co.
"Plastic Behavior of Wide Flange Beams," by W. H. Luxion, and B. G. Johnston, Fritz Engineering Laboratory, Lehigh University

Inert-Gas-Shielded Arc Welding

North Garden

Chairman: R. F. Wyer, General Electric Co.

Co-Chairman: G. O. Hoglund, Aluminum Company of America

"Practical Aspects of Inert Gas Shielded Arc Welding Process," by A. N. Kugler, and H. A. Huff, Jr., Air Reduction Sales Co.
"Welding Pure Copper for Pressure Vessels to ASME U69 and Case 934 with Heliarc Process," by John W. Mortimer, Whitlock Mfg. Co.
"Production Heliwelding Stainless Steel," by Newton A. Blickman, S. Blickman, Inc.
"Inert-Gas-Shielded Spot Welding," by Frank J. Pilia, The Linde Air Products Co.

Maintenance

South Garden

Chairman: George Nigh, Tide Water Associated Oil Co.

Co-Chairman: H. R. Morrison, The Linde Air Products Co.

"Diversified Welding in Chemical Plant Maintenance," by Elvin M. Ratcliff, Ethyl Corp.
"Welding in Steel Mill Maintenance," by L. P. Elly, Bethlehem Steel Co.
"What a Maintenance Department Can Do With Welding and Cutting," by Jamison Moore, Union Bag & Paper Co.

THURSDAY EVENING

Annual Dinner

Rose Garden

FRIDAY MORNING, OCT. 29th—9:30 A.M.
THREE SIMULTANEOUS SESSIONS

Automatic Welding

South Garden

Chairman: T. M. Jackson, Sun Shipbuilding & Dry Dock Co.

Co-Chairman: George Johnson, The Lincoln Electric Co.

"Automatic Submerged-Arc Welding of One-Inch Alloy Steel Plates," by Howard L. Miller, Republic Steel Corp.
"Production Tooling for Automatic Welding," by Cecil C. Peck, Cecil C. Peck Co.

Miscellaneous

Rose Garden

Chairman: Geo. Trefts, Farrar & Trefts Inc.

Co-Chairman: A. A. Holzbaur, Sun Shipbuilding & Dry Dock Co.

"Ceramic and Composite Back-Ups for Grooved Weld Joints," by Chester R. Austin and P. J. Rieppel, Battelle Memorial Institute
"All Welded Fabrication of Shipping Containers by Resistance and Fusion Methods," by G. J. Green and D. H. Marlin, Dravo Corp.
"Future Welded Design of Farm Equipment," by Ernest J. Koop, Ernest J. Koop Welding and Blacksmith Shop

Hard Facing and Flame Hardening

North Garden

Chairman: C. H. Jennings, Westinghouse Electric Corp.

Co-Chairman: R. A. Guenzel, Southern Oxygen Co.

"Economies of Hard Facing," by J. J. Barry, and Albert Muller, Air Reduction Sales Co.
"Hard Facing and Surfacing with Inert-Gas-Shielded Arc Welding Process," by K. H. Koopman, The Linde Air Products Co.
"Flame Hardening Methods and Techniques," by J. R. Burg, The Baldwin Locomotive Works

PROGRAM

Institute of Metals Division

All Meetings at Hotel Adelphia, Oct. 25-27

MONDAY, OCTOBER 25

8:30 a.m.-5:00 p.m.—Registration
9:00 a.m.—Properties of Metals and Alloys
Jefferson Room
P. R. Kosting and W. A. Johnson, Chairmen

"Room and Elevated Temperature Properties of Some Sand Cast Magnesium-base Alloys Containing Zinc," by T. E. Leontis, Dow Chemical Co.
"Low Temperature Properties of Tin and Tin-lead Alloys," by H. S. Kalish and F. J. Dunkerley, University of Pennsylvania.
"Thermal and Electrical Properties of Ductile Titanium," by E. S. Greiner and W. C. Ellis, Bell Telephone Laboratories Inc.
"Property Changes During Aging," by A. H. Geisler, General Electric Co.

9:00 a.m.—Microscopy and Grain Growth
Crystal Room
D. L. Martin and J. E. Burke, Chairmen

"Correlation of Optical and Electron Microscopy," by J. S. Bryner, Pennsylvania State College.
"Fractographic Study of Cast Molybdenum," by C. A. Zapffe, F. K. Landgraf and C. O. Worden, metallurgists, Baltimore, Md.
"Effect of Composition on Grain Growth in Aluminum-magnesium Solid Solutions," by L. J. Demer, Murray Co. Inc. and P. A. Beck, University of Notre Dame.
"Effect of a Dispersed Phase on Grain Growth in Aluminum-Manganese Alloys," by P. A. Beck, M. L. Holzworth, and Philip Sperry, University of Notre Dame.

2:00 p.m.—Properties of Metals and Alloys
Jefferson Room
R. S. French and E. W. Palmer, Chairmen

"Factors Affecting the Tensile Notch Sensitivity of Magnesium Alloy Extrusions," by I. Cornet, University of California.
"Effect of Grain Size on Tensile Strength Elongation and Endurance Limit of Deep Drawing Brass," by H. L. Walker and W. J. Craig, University of Illinois.
"A Copper-base Alloy Containing Iron as a High-strength High-conductivity Wire Material," by Webster Hodge, R. I. Jaffe, J. G. Dunleavy and H. R. Ogden, Battelle Memorial Institute.
"A High Strength-high Conductivity Copper-silver Alloy Wire," by Webster Hodge, R. I. Jaffe, J. G. Dunleavy and H. R. Ogden, Battelle Memorial Institute.

2:00 p.m.—Constitution and Precipitation
Crystal Room
G. E. Doan and W. L. Fink, Chairmen

"The Cobalt-Chromium Binary System," by A. R. Elsea, A. B. Westermann and G. K. Manning, Battelle Memorial Institute.
"Solubility of Iron in Solid Aluminum," by J. K. Edgar, Aluminum Research Laboratories.
"Mechanism of Precipitation in a Permanent Magnet Alloy," by A. H. Geisler, General Electric Co. and J. B. Newkirk, Carnegie Institute of Technology.
"Some Effects of Applied Stresses on Precipitation Phenomena," by W. L. Finlay, Remington Arms Co. and W. R. Hibbard, Jr., Yale University.

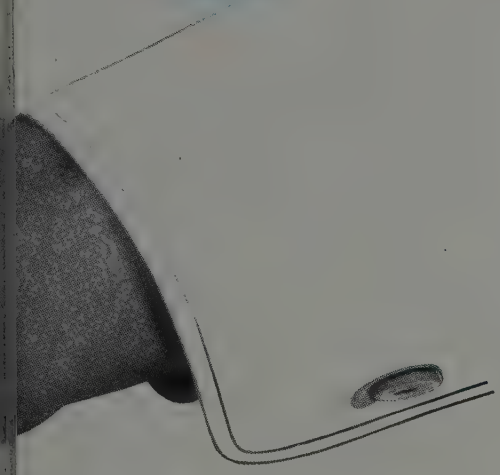
TUESDAY, OCTOBER 26

8:30 a.m.-5:00 p.m.—Registration

9:00 a.m.—Plastic Deformation
Jefferson Room
M. Gensamer and W. R. Hibbard, Jr., Chairmen

"Statistical Rate Theory of Metals—Mechanism of Flow and Application to Tensile Properties," by J. W.

chrome-nickel stainless strip steel with "dead-soft" workability and glistening mirror finish



The illustration at the left is an actual photograph of a piece of .005" bright-annealed cold rolled 18-8 Stainless Thinsteel folded double with the grain.

It demonstrates the workability of this dead-soft material produced by CMP's exclusive bright-annealing process.

It shows the bright, mirror-like finish in which CMP annealed chrome-nickel grades are now produced.

It illustrates how you can give your product the added sales appeal of a mirror-finish in combination with greater corrosion-resistance without increasing your fabricating costs — possibly with an actual saving.

Produced in gauges as thin as .001", it opens new fields for application of cold rolled chrome-nickel stainless strip steel.

Available in long coils, it reduces down-time of coil-fed fabricating machines.

A request on your business letterhead will bring a sample which will enable you to judge how much you can improve your product usefulness and appearance with CMP bright-annealed chrome-nickel Stainless Thinsteel.

C M P STRIP STEEL
PRECISION COLD ROLLED

the Cold Metal Products co.
YOUNGSTOWN 1, OHIO

NEW YORK • CHICAGO • DETROIT • ST. LOUIS • BUFFALO • INDIANAPOLIS • LOS ANGELES • SAN FRANCISCO

Fredrickson and Henry Eyring, University of Utah.
"Influence of Size and Stress System on Flow Stress and Fracture Stress of Metals," by D. J. McAdam, Jr., G. W. Geil, D. H. Woodard and W. D. Jenkins, National Bureau of Standards.
"Nucleation of Slip Bands," by J. G. Leschen, R. P. Carreker and J. H. Hollomon, General Electric Co.
"Transient Plastic Deformation," by R. P. Carreker, J. G. Leschen and J. D. Lubahn, General Electric Co.

12:15 p.m.—Institute of Metals Division Executive Committee, Luncheon and Meeting

Coral Room

2:00 p.m.—Plastic Deformation (Continued)

Jefferson Room

R. F. Mehl and J. C. McDonald, Chairmen

"Plastic Deformation of Large Grained Copper Specimens," by W. R. Hibbard Jr., Yale University.
"Plastic Flow in Anisotropic Sheet Steel," by L. R. Jackson and K. F. Smith, Battelle Memorial Institute and W. T. Lankford, Carnegie-Illinois Steel Corp.
"Flow and Fracture Characteristics of Aluminum Alloy 24ST after Alternating Tension and Compression," by S. I. Liu and G. Sachs, Case Institute of Technology.
"Effect of Thermal-Mechanical History on Strain Hardening of Metals," by J. E. Dorn, A. Goldberg and T. E. Tietz, University of California.

TUESDAY, OCTOBER 26

8:30 a.m.-5:00 p.m.—Registration

9:00 a.m.—Rod and Wire Production Practice

Crystal Room

A symposium arranged by the Institute of Metals Division Program Committee, O. B. J. Fraser, Symposium Chairman

S. P. Watkins and F. E. Bash, Chairmen

"An Appraisal of Wire Products in Industry," by W. F. Hodges and T. S. Fuller, General Electric Co.
"Production of High-carbon Steel Wire," by C. W. Garrett, Jones & Laughlin Steel Corp.
"Hot Rolling and Cold Drawing of Some of Corrosion and Heat Resisting Alloy Rods and Wire," by J. K. Findley, Allegheny-Ludlum Steel Corp.
"Hot and Cold-working of Nickel-copper Alloy Rods and Wire," by M. F. Buck and N. C. Britz, The International Nickel Co. Inc.

2:00 p.m.—Rod and Wire Production Practice (Continued)

Crystal Room

N. L. Mochel and Alan Morris, Chairmen

"Production of Copper and Copper-alloy Rods and Wire by Rolling and Drawing," by P. H. Kirby, American Brass Co.
"Production of Copper-base Alloy Rod by Hot Extrusion," by L. E. Thelin, Scovill Mfg. Co.
"Fabrication of Aluminum and Aluminum-alloy Rod, Bar and Wire," by W. T. Ennor, Aluminum Co. of America.
"Production of Magnesium-alloy Rod and Wire," by G. Ansel, Dow Chemical Co.

6:00 p.m.—Annual Fall Dinner

Crystal Room

Toastmaster: A. A. Smith, Jr., chairman, Institute of Metals Division.
Speaker: Dr. Waldo E. Fisher, professor of industry, Wharton School, University of Pennsylvania "The Taft-Hartley Act; An Appraisal."

WEDNESDAY, OCTOBER 27

8:30 a.m.-5:00 p.m.—Registration

12:30 p.m.—Powder Metallurgy Committee Luncheon and Meeting

Coral Room

2:00 p.m.—Diffusion and Surface Phenomena

Jefferson Room

R. Smoluchowski and M. L. Fuller, Chairmen

"Diffusion of Carbon in Austenite with a Discontinuity in Composition," by L. S. Darken, U. S. Steel Corp.
"An Electron Diffraction Study of Oxide Films Formed on Nickel-chromium Alloys," by J. W. Hickman and E. A. Gulbransen, Westinghouse Research Laboratories.
"An Electron Diffraction Study of Oxide Films Formed on Copper-nickel Alloys at Elevated Temperatures," by J. W. Hickman and E. A. Gulbransen, Westinghouse Research Laboratories.
"Decarburization of Chrome Nickel Alloys by their Surface Oxides in High Vacua and at Elevated Temperatures," by E. A. Gulbransen, W. S. Wysong and K. Andrew, Westinghouse Research Laboratories.

2:00 p.m.—Transformation

Crystal Room

C. S. Smith and A. R. Troiano, Chairmen

"Effect of Chromium on the Ms Point," by J. B. Bassett and E. S. Rowland, Timken Roller Bearing Co.
"The Kappa Eutectoid Transformation in the Copper-silicon System," by W. R. Hibbard Jr., G. H. Eichelman Jr., and W. P. Saunders, Yale University.
"Stabilization of the Austenite-martensite Transformation," by W. J. Harris Jr., Naval Research Laboratory and M. Cohen, Massachusetts Institute of Technology.
"Secondary Hardening of Tempered Martensitic Alloy Steel," by Walter Crafts and J. L. Lamont, Union Carbide & Carbon Research Laboratories Inc.

WEDNESDAY, OCTOBER 27

4-5:30 p.m.—Membership Committee Meeting

Junior Room, First Floor

Society For Non-Destructive Testing

Eighth Annual Meeting and Convention

All Sessions at Hotel Benjamin Franklin, Oct. 27-28

WEDNESDAY, Oct. 27
9:30 a.m. to 12 noon

"Possible Industrial Applications of Soft Radiation—10 to 100 Killovolts," by E. Dale Trout, General Electric X-Ray Corp.
"Installation of and Adjustments to a Mobile Betatron," by Donald T. O'Connor, U. S. Naval Ordnance Laboratory.
"Field Processing of Radiographic Films Where Water Supply is at a Premium," by Royal G. Tobey, Eastman Kodak Co.
"Experimental Work Employing Radioisotopes Cobalt and Selenium," by Don M. McCutcheon, Ford Motor Co.

2:00 p.m. to 4:30 p.m.

"High Speed Cine Radiography," by C. W. Slack and L. F. Ehrke, Westinghouse Electric Corp.
"Gamma Radiography of Bronze Castings," by Howard F. Taylor, Massachusetts Institute of Technology.
"Radiographic Examination of Abrasive Wheels," by Margaret J. Johnson, Carborundum Co.
"Spotweld Radiography," by Robert C. McMaster, Battelle Memorial Institute.

THURSDAY, OCT. 28

9:30 a.m. to 12 noon

"X-Ray Diffraction as a Non-Destructive Testing Method of Magnetic Materials," by J. J. Pierce, U. S. Naval Ordnance Laboratory.
"New Testing Methods for Ceramic Products," by Carl E. Betz, Magnaflux Corp.
"A Universal Exposure Calculator for Radium Radiography," by Noah A. Kahn, Emil A. Imbembo and Jay Bland, N. Y. Naval Shipyard.

2:00 p.m. to 4:30 p.m.

The 1948 *Mehl Lecture*

"The Supersonic Reflectoscope, an Instrument for Non-Destructive Testing and Measuring by Means of Sound Waves," by Dr. Floyd A. Firestone.

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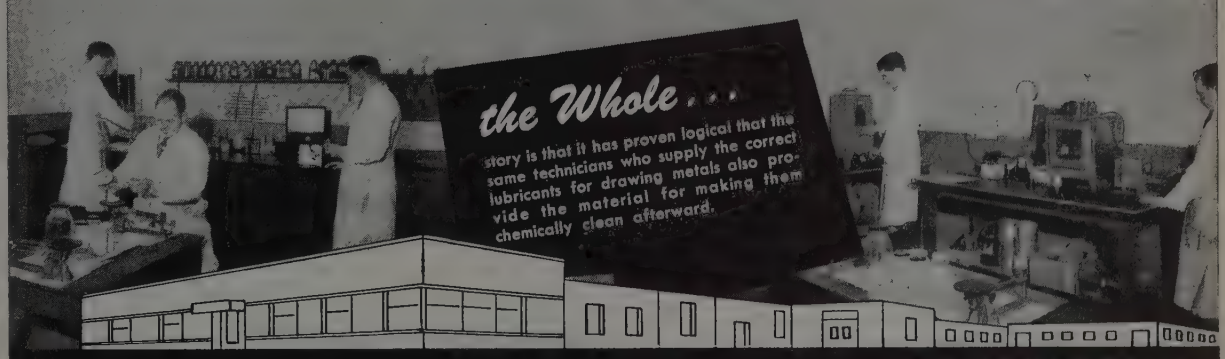
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TECHNICAL PAPERS

Scheduled to be presented during the National Metal Congress and Exposition are an imposing number of technical papers, some of which are abstracted here to aid visitors in determining the session of most interest to them. The following are ASM papers, with AWS paper abstracts starting on page 147

Isothermal Decomposition of Martensite, Retained Austenite

By B. L. Averbach, assistant professor of metallurgy, and Morris Cohen, professor of physical metallurgy, Massachusetts Institute of Technology

Rates of isothermal decomposition of martensite and retained austenite were determined by x-ray diffraction and by precise measurements of length. Two steels were studied: Carbon toolsteel containing 1.07 per cent C, and S.A.E. 52100 with 0.21 per cent V. The steels were quenched from below A_{cm} and therefore contained undissolved carbide.

During the first stage of tempering at low temperature, martensite rejects part of the dissolved carbon. Retained austenite also decomposes isothermally at low aging temperatures. As much as 5 per cent retained austenite may tranform isothermally at room temperature. Austenite decomposes rapidly during the first 1½ hours after the quench, and more slowly for several months. If the tempering temperature or time is increased enough, the retained austenite decomposes to bainite.

Transformation of Austenite Steels

By A. R. Troiano, professor of metallurgy, University of Notre Dame

Author presents isothermal transformation diagrams for three steels (S.A.E. 5140, 2340 and T1340) that have nearly identical Jominy hardenability curves. The amounts of retained austenite and the microstructures of the Jominy bars are correlated with the transformation characteristics of austenite in the same steels.

In the isothermal transformation diagrams for the three steels, the relative positions of the A_1 temperatures and of the pearlite and bainite reactions differ, causing different amounts of overlapping of the pearlite and banite reactions in the three steels.

The Jominy bars were cut up and analyzed by x-ray diffraction to determine the relative amounts of austenite at different positions along the bar. In each steel, only a small amount of austenite is retained near the quenched end of the Jominy specimen. This amount increases to a maximum at about 1 inch from the quenched end, and then decreases. For similar treatment, steel 2340 retains slightly more austenite than T1340, and substantially more than 5140.

Influence of Ni and Mo on the Isothermal Transformation of Austenite

By D. A. Scott, instructor in physical metallurgy, W. M. Armstrong, associate professor of physical metallurgy, and F. A. Forward, professor and head, department of mining and metallurgy, University of British Columbia

A metallographic investigation of isothermal transformation of austenite is described for two series of pure iron-nickel-carbon alloys containing 0.55 per cent C and 0, 2, 3.75 and 5 per cent Ni. One series contained no molybdenum, the other 0.35 per cent molybdenum.

In alloys without molybdenum, as the nickel content is increased: The appearance of visible proeutectoid ferrite and of pearlite is retarded; the formation of nodular bainite is more readily observed; the minimum temperature for formation of nodular bainite is lowered appreciably.

In alloys containing 0.35 per cent Mo, as the nickel content is increased: The appearence of visible proeutectoid ferrite is retarded more than in the molybdenum-free alloys; the acicular character of ferrite formed at intermediate temperature becomes more apparent; the acicular ferrite and feathery bainite reactions, as represented on the isothermal curves, become more separated.

In all 0.35 per cent Mo alloys examined: The acicular ferrite reaction is followed by carbide rejection and later by agglomeration and growth of the carbide phase as a separate constituent; the time required for the formation of visible proeutectoid ferrite is approximately ten times that observed in the molybdenum-free alloys, and this multiplying factor is uninfluenced by temperature or nickel content; the similar multiplying factor for bainite is uninfluenced by temperature but is apparently decreased exponentially by increasing nickel content.

Microstructure of Low-Carbon Steel

By R. L. Rickett, assistant supervisor, physical metallurgy section, and F. C. Kristufek, Research Laboratories, United States Steel Corp.

Most of the data in this paper are for rimmed steel containing 0.06 per cent C and 0.43 per cent Mn. A tentative isothermal transformation diagram indicates that ferrite forms very rapidly from austenite in this steel, even at temperatures well above Ae_1 (1335°F). Transformation of the remaining austenite requires more than 24 hours just below Ae_1, about 15 seconds at 1200°F, and less than 1 second below 1000°F. The M_s temperature is probably about 900°F for this steel. Thus a marked change in the rate of cooling has only slight effect on the transformation temperature range.

Reheating previously box-annealed steel (R_B50) dissolves carbon in ferrite and increases the hardness to as much as R_B70. Further hardening to about R_B90 will occur during the subsequent aging of the fully solution-treated ferrite at room temperature.

Eighty-eight micrographs are included in the paper and these illustrate the effects of the following variables: Austenite transformation temperature and time, rate of continuous cooling, prior austenite grain size, prior ferrite grain size, prior carbide grain size and distribution, temperature and duration of carbide precipitation from ferrite, and temperature and duration of prior annealing. The amount of cold reduction is also a variable.

Transformation Characteristics of Ten Selected Nickel Steels

By J. P. Sheehan, associate metallurgist, Armour Research Foundation, C. A. Julien, patent adviser, Naval Research Laboratory, and A. R. Troiano, professor of metallurgy, University of Notre Dame

Isothermal transformation diagrams are presented for ten nickel steels containing from 5 to 10 per cent Ni and 0.25 to 1.2 per cent C. Dilatometric and metallographic methods were used in studying these steels. Some of the transformation diagrams are entirely different from anything that has been published.

In the 5 per cent Ni steels, bainite transformation is shown throughout the entire range between the Ae_1 and M_s temperatures. The sequence of reactions above the temperature of maximum rate is: Proeutectoid ferrite (or carbide), bainite, pearlite.

No pearlite reaction was observed in any of the steels containing 7.5

and 10 per cent Ni, although the specimens were held at temperature for as long as four months. In several of the steels, separate precipitations of carbide and ferrite transform the austenite completely, with no pearlite or bainite formation.

Metallography and Heat Treatment of 8-10 Per Cent Ni Steel

By G. R. Brophy, metallurgist in charge of steel research, and A. J. Miller, metallurgist, International Nickel Co.

Data are included for various steels containing 0.1 per cent C and from 3 to 15 per cent Ni, and for various heat treatments investigated during the development of the composition and heat treatment that would give optimum properties at low temperature.

A nickel steel developed for use at temperatures as low as —320° F has the following composition: 0.12 per cent maximum C, 0.35 to 1.00 per cent Mn, 0.15 to 0.30 per cent Si, 8 to 10 per cent Ni. This steel develops the optimum combination of strength and notched-bar impact resistance at —320° F after it has been heat treated in four steps.

The first two treatments (double normalizing) produce a uniform dispersion of carbides in a fine-grained ferrite-martensite matrix, which also contains about 10 per cent retained austenite. Reheating the double-normalized steel to 1050° F (which is above AE_1) dissolves carbides in austenite, which increases in amount to about 15 or 20 per cent. The final heating to between 800 and 1000° F relieves stresses but does not transform any detectable fraction of the "stabilized" austenite.

The nickel content of the steel must be at least 8 per cent in order to obtain the required toughness at 320° F after the austenite-stabilizing heat treatment. Increasing the nickel content beyond 10 per cent gives no advantage commensurate with the added cost.

Predicting the Effect of Complex Tempering Cycles

By J. L. Weisman, metallurgist, Douglas Aircraft Co., and W. T. Snyder, chief engineer, Herff Jones Co.

A method is described for predicting the effect of multiple tempering or of a complex time-temperature cycle on the hardness of quenched steels. The technique involves the division of any complicated tempering cycle into a series of small isothermal steps and the integration of the softening effects of all such steps.

Experimental isothermal tempering data are presented for two medium-carbon alloy steels (S. A. E. 4140 and a boron-treated manganese-molybdenum steel). These data are used to illustrate predictions of the effects on hardness of variations in heating and cooling rate, and of fluctuations in the tempering temperature. Differences between predicted and observed hardnesses are not greater than 1 point.

The data are compared also with the predictions obtained from a general relationship proposed by Hollomon and Jaffe in a recently published paper. Most of these predictions are within 1 point of the experimental data.

Distribution of Inclusions in Killed Alloy Steel Ingots

By K. L. Fetters, special metallurgical engineer, Youngstown Sheet & Tube Co., M. M. Helzel, analytical chemist, and J. W. Spretnak, member of staff, Metals Research Laboratory, Carnegie Institute of Technology

This is the sixth in a series of papers concerning the influence of various factors in ingot freezing and structural characteristics of killed alloy steel ingots on the resulting quality of heavy-wall seamless tubes made from the ingots.

The nonmetallic inclusions in nine

(*Please turn to Page* 164)

AWS Technical Papers

New Factors in Design, Welding of Ships

By Milton Forman, United Engineering Co.

Most recent research and service records of hatch corners in terms of the relative importance of design and the factors affecting the notch toughness of steel are evaluated. Design features are considered in relation to their relative effect. Question is raised as to the correctness of the theory that double reinforcement is necessary in way of discontinuities. Attention is given to the effect of size and thickness on the ductility of welded structures. A comparison is also made as to the behavior of riveted structures in relation to welded ones.

Sampling Welds by Trepanning and Allied Methods

By R. B. Lincoln, Pittsburgh Testing Laboratory

Trepanning and similar means of sampling welds for quality control has come into considerable use because of the reliable results secured with relatively inexpensive equipment, and ordinary mechanical skill. The method is classed as nondestructive, although some welding is usually required to replace the metal removed in the sampling. The method is acceptable under several codes. An endeavor is made to present its advantages and limitations. Brief instructions are given on the removal of the samples, their etching and final protection if they are to be preserved.

Effect of Fabrication on Steels in Pressure Vessels

By C. J. Osborn, A. F. Scotchbrook, R. D. Stout, and B. G. Johnston, Lehigh University

This is a report on an extensive investigation designed to compare various steels as to their relative tendency toward brittle behavior at low temperature. Two steels, rimmed and aluminum killed, each in two thicknesses (⅝" and 1¼") have been selected for the overall test program.

Particular emphasis in this program is being placed on the effect of fabrication processes involving plastic strain followed by heat, with or without welding, and subsequent strain aging. Since no standard test is generally accepted as a means to determine transition temperature it was necessary to select a test from the several in current use. It is the purpose of this report to present the results of a comparison of different test methods on the basis of which the procedure to be used in the main program was determined. Later progress reports will present test results of the main investigation.

Axial Tension Impact Tests of Structural Steels

By W. H. Bruckner and N. M. Newmark, University of Illinois

Axial tension impact tests were made on a number of project steels used in the "wide plate" investigation. Tests were made on notched specimens of various types, and with different amounts of initial energy of the pendulum of the impact testing machine. As a result of the preliminary tests a standard specimen was evolved, with a semicircular notch of 0.039-inch radius, a root diameter of 0.294-inch, and an outside diameter of 0.625-inch. Tests were run on these standard specimens at a number of different values of initial energy of the pendulum, obtained by varying the height of the pendulum before release. Results of tests indicate an approximately linear de-

(*Please turn to Page* 192)

Tonnage Oxygen

Versatile Aid

. . . for increasing iron and steel output

Use of oxygen will not be confined to any single operation but will be used for enriching the blast to blast furnaces to accelerate combustion and decarburization in open hearth furnaces, and for enriching the blast to the bessemer converters as dictated by economic and local plant conditions

By JULIUS STRASSBURGER
Manager, Dept. of Service and Maintenance
Weirton Steel Co.
Weirton, W. Va.

USE of tonnage oxygen as a tool for increasing production of iron and steel has come into prominence during the past two years with extensive experimental work being done by a majority of steel companies in this country and Canada. A large part of this experimental work has been confined to the use of oxygen for open hearth furnace operation, both in accelerated combustion of liquid fuels and direct reduction of carbon with the oxygen being introduced into the bath of the open hearth furnace.

During World War II the United States was faced with the necessity of building oxygen plants to eliminate handling of oxygen cylinders which were costly and bulky to ship to the theaters of war, and also because cylinders were in short supply and unavailable in the quantities required. In conjunction with the National Defense Research Council the oxygen producing companies, together with the technical talent of this country, developed portable and stationary oxygen plants for use in the Pacific, on shipboard and at other battlefronts. As a result of this development, the knowledge was obtained which was necessary to build large plants without chemicals using low pressure, 80 to 90 psi gage, centrifugally compressed air so that the groundwork was laid for the designing and building of plants for producing tonnage oxygen for American industry and a new tool was made available for expanding the production of iron and steel.

Oxygen Cost Set At 55c Per Ton—It will be noted from Table I that the amount of oxygen required for enriching the blast to a 25 per cent oxygen content for a blast furnace using 70,000 cfm of wind amounts to 240 tons of oxygen daily. At a cost of $3.00 per ton of oxygen, the cost of this enriching would amount to $720.00 per day, equivalent to 55c per ton based on a 1300-ton daily iron production. This cost of oxygen would have to be balanced by possible savings in coke, stone, labor and material

Condensation of paper presented before American Iron & Steel Institute, New York, May 26-27, 1948.

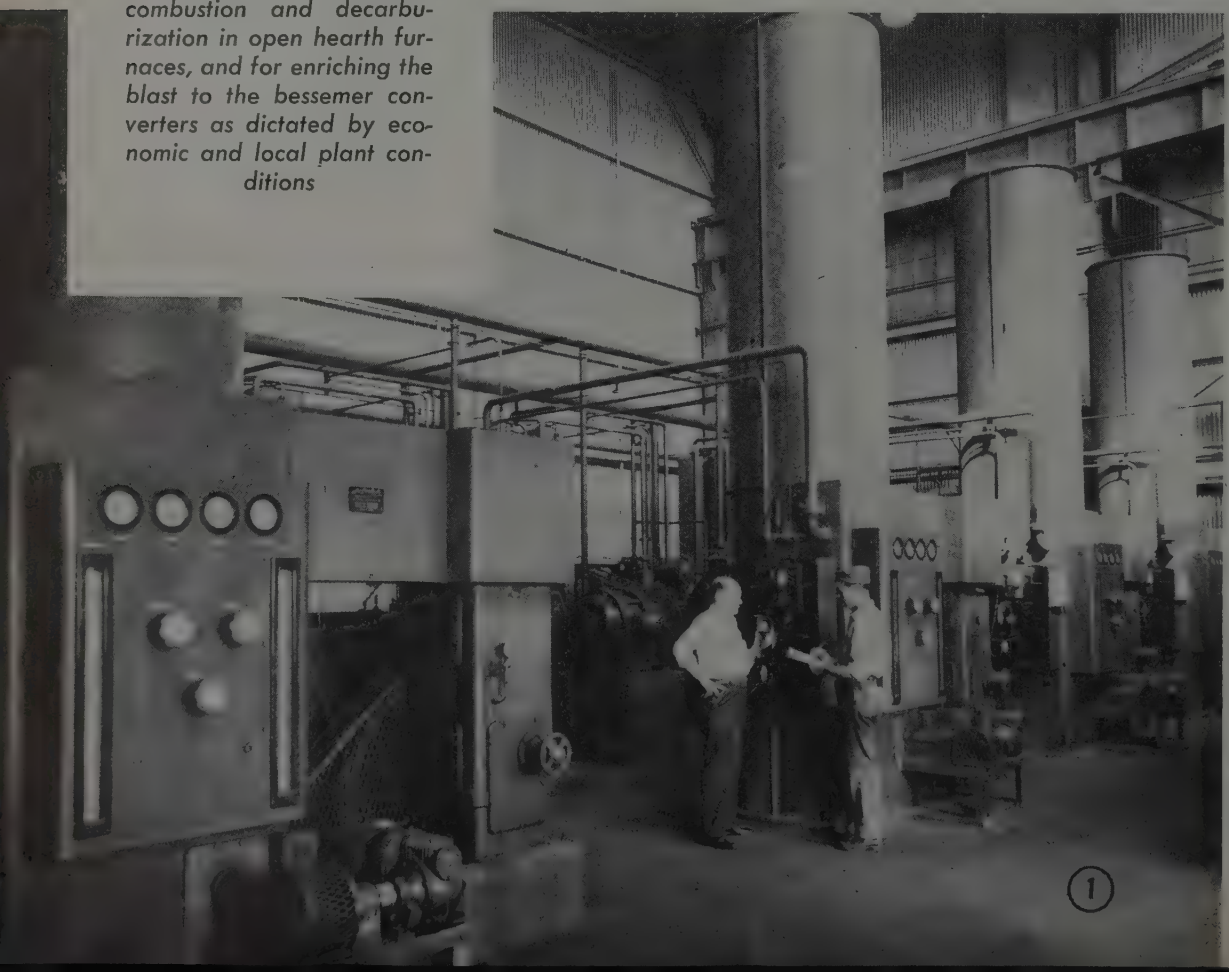

Fig. 1—Oxygen plant installation

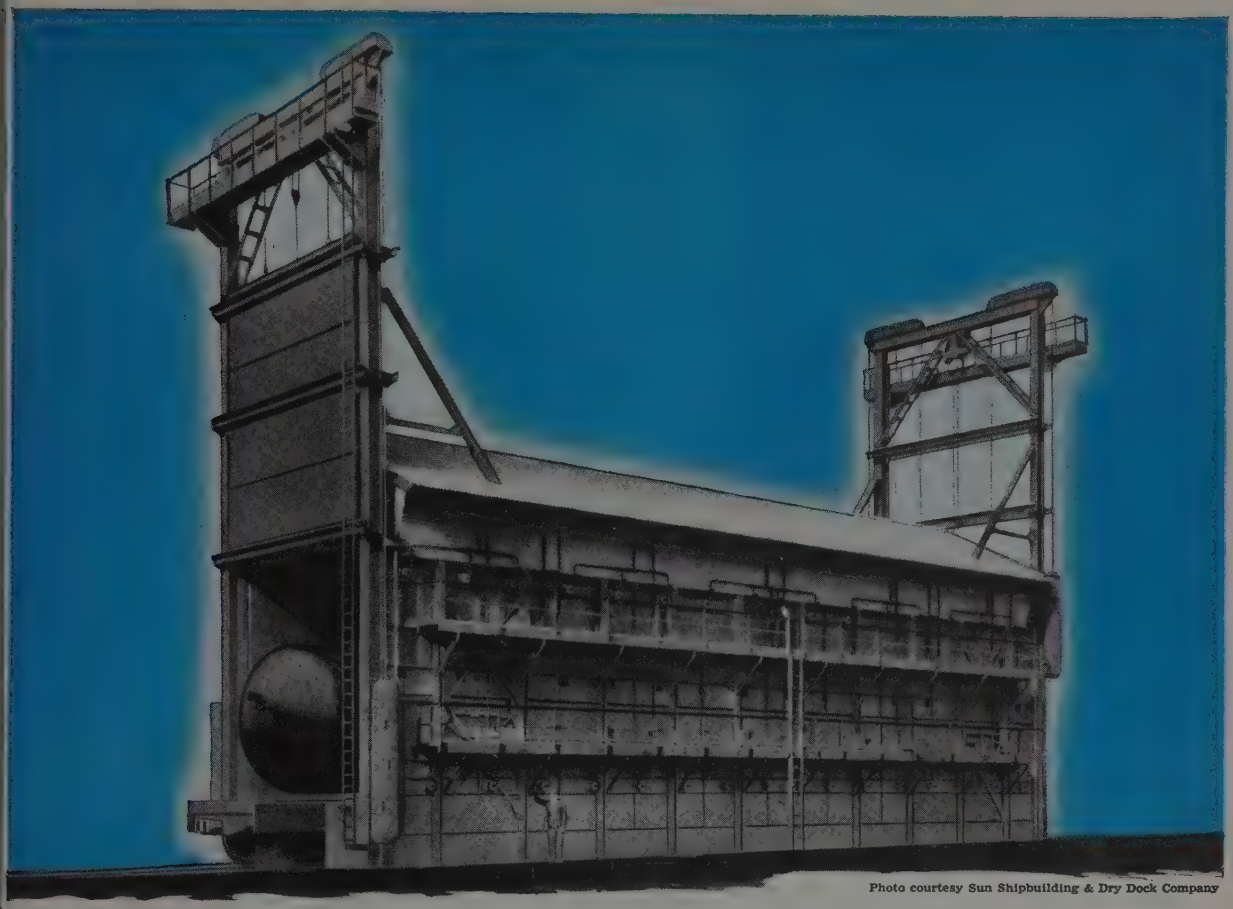

Photo courtesy Sun Shipbuilding & Dry Dock Company

The furnace that PAID FOR ITSELF MANY TIMES OVER

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It is no wonder the operators can report:
"This furnace has paid for itself many times over."

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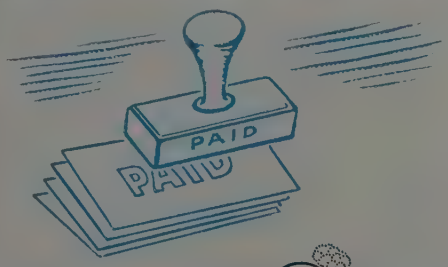

R-310

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Fig. 2—High pressure oxygen storage bank

costs, due to the increased production of the furnace with oxygen.

Table II shows the equivalent volumes of normal air that would be required to equal 70,000 cfm of oxygenated air at varying percentages.

Exhibit A shows the calculations of both gas analyses in blast furnace operation when using normal air as compared with enriched air at 25 per cent, 27 per cent and 30 per cent oxygen content.

The increase in carbon monoxide content of the bosh gas to 40 per cent with 25 per cent oxygen content in the blast as compared with 34.5 per cent carbon monoxide content of the bosh gas from ordinary air will speed the reduction of iron ore by about 8 per cent. When the temperature gradient of the furnace drops below the normal for air, any loss in temperature will, of course, have a negative effect nullifying advantage of the richer CO gas.

Table III shows the volume of blast and bosh gas with varying oxygen enrichment as worked out by T. L. Joseph. This tabulation also shows the factors for the relative driving rate based on a constant volume of blast mixture and bosh gas. For example, with 25 per cent enrichment the relative driving rate of a blast furnace based on a constant volume of blast mixture is shown as 1.19 times the normal rate. However, the factor for maintaining a constant volume of bosh gas is 0.97 so that the net driving factor when maintaining a constant volume of bosh gas from the combustion zone is 1.15, obtained by multiplying 1.19 x 0.97.

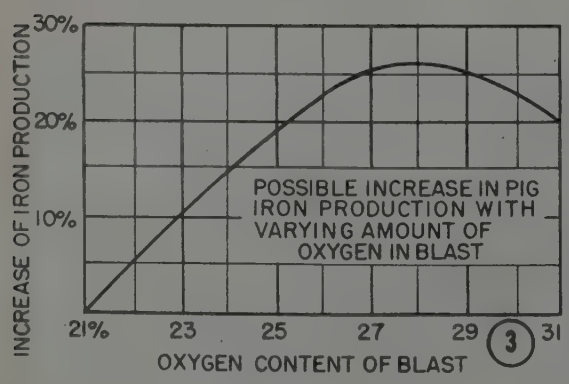
Table IV shows the oxygen required for varying enrichment based on a blast furnace using 1600 pounds of coke per ton of pig iron as worked out by T. L. Joseph. It will be noted that this tabulation also shows the pounds of oxygen required from an oxygen plant per ton of iron produced for varying enrichment together with the cost of this oxygen per ton of iron based on $3.00 per ton oxygen cost. This cost goes up substantially with the increase in enrichment so that the cost of oxygen is considerably more at the higher percentages of enrichment and would require substantially greater savings in operation to counterbalance the oxygen cost.

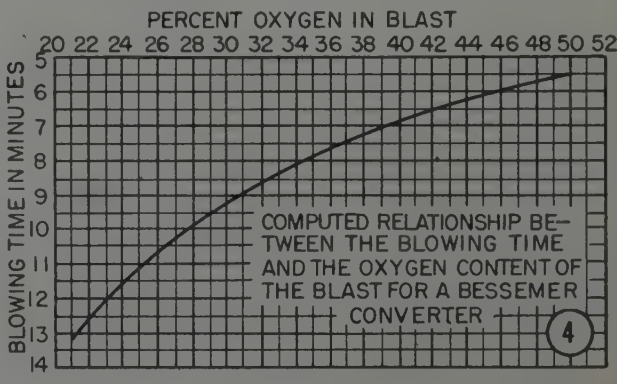
Fig. 3 shows the possible percentage increase in the production of a blast furnace based on varying the percentage of blast enrichment. This estimated production curve indicates that the increase in production obtained by the use of oxygen on blast furnaces as designed at present may not increase continuously with greater percentages of oxygen, but at about 27 per cent or 28 per cent oxygen content in the blast a maximum benefit may be obtained after which the use of oxygen might actually show a lesser benefit.

From the data studied up to date, as well as from the calculations made by W. E. Marshall, we find that the use of oxygen in the conventional present day blast furnace will not eliminate the use of stoves for preheating the blast as the additional heat in the blast is necessary to maintain the proper heat input to the furnace and actually if oxygen is used with cold blast there is a definite deficiency of heat input for maintaining blast furnace operation.

Conclusions On Blast Furnace Operation—In summarizing use of oxygen for enriching air used for the blast furnace, we find from existing information that with present furnace design the amount of enrichment is probably limited from 26 per cent to 28 per cent as a maximum. Preheating of blast will still be necessary to maintain heat input to the furnace. A moderate saving in coke with an increased iron production of from 10 per cent to 20 per cent will be possible dependent upon amount of enrichment. The operation of the furnace with oxygen should show lowered flue dust per ton of iron produced with lowered top gas temperature, lowered top gas volumes, but higher Btu content of the top gas. Use of oxygen should make the blast furnace operation smoother with the ability to adjust temperatures quickly maintaining hot iron with possible lower sulphur in the pig iron.

Oxygen In Bessemer Converter—





Next step in the use of oxygen metallurgically is in the bessemer converter. Actual tests have been made at Weirton with a limited supply of oxygen for oxygenating the blast on a 25-ton vessel, but we will first review work done in Germany.

E. Karwat states that the use of oxygenated blast in a converter is correct from a technical standpoint as waste gases leaving the vessel at a temperature up to 2700° F have a heat loss of approximately 50 Btu for each cubic foot of nitrogen in the waste gases. In a bessemer converter the quantities of nitrogen blown through the vessel are large so that heat loss of the escaping nitrogen is considerable. As oxygen in the blast is increased with a corresponding decrease in nitrogen, heat saved is retained in the vessel of the converter. This heat can be used to raise the temperature of the molten metal for accelerating carbon elimination and also for melting greater additions of cold scrap. The largest use of oxygen in Germany has been in the making of steel and particularly in the basic bessemer process. A basic bessemer plant in southern Germany has been using 30 per cent oxygen in the blast for some time. This plant has worked out the formula that for every cubic foot of nitrogen removed from the blast 0.0625 pounds of additional scrap can be melted and in this way scrap charge to the bessemer is practically doubled.

Dr. J. Haag experimented with use of oxygen for the bessemer converter as early as 1925 when cylinders of oxygen were used for making preliminary tests. A considerable number of calculations and theoretical determinations were made at that time to determine the benefits of using oxygen. Exhibit B (p. 156) shows the calculations for determining duration of blowing time when increasing oxygen in the blast.

Fig. 4 shows the computed relationship between blowing time and oxygen content of the blast. Points on the curve are computed with the practical assumptions that:

Total oxygen requirements are ..... 44,200 cu ft.

Blast volume per minute ..... 44,200 cu ft.

and that temperature conditions of the melts are kept uniform by proper scrap additions. Thus, for example, blowing time required for normal air blast without oxygen enrichment is readily computed. (44,200/21)(100)= 210,000 cubic feet of blast needed and 210,000/15,900=13.25 minutes blowing time.

Table V shows the computed relationship between blowing time and oxygen content of the blast. The last two columns show actual number of minutes as well as percentage shortening of blowing time with increasing oxygen content in the blast to the bessemer converter.

Table VI shows some actual results when adding oxygen to the air blast and its effect upon blowing time.

Table VII shows some actual results on amount of scrap charged with varying amounts of oxygen in the blast to the bessemer converter.

In general with a blast content of 25 per cent oxygen blowing time is reduced by 16 per cent as compared with ordinary air and by 30 per cent when using a blast containing 30 per cent oxygen. (It is possible that when using the bessemer for producing blown duplex metal that a greater saving in time is possible than when producing basic bessemer steel.) Dr. Haag also found, as developed by later practical experience, that additional scrap could be charged with the higher temperatures obtained in the molten metal when using oxygen.

Advantages of Oxygen in the Bessemer—As will be noted above, time of blowing was materially reduced when using 30 per cent oxygen and amount of scrap charged was almost doubled. The report stated, "The effect of the oxygen could be observed at once, the flame was much whiter and brighter. Oxygen was continually added all through the carbon period. The blow proceeded smoothly, the ejections did not seem to be greater than those in the heat without oxygen. About thirty seconds before the end of the carbon flame, oxygen was shut off and the final dephosphorizing was blown without oxygen."

Oxygen was used for approximately 65 per cent of the blowing time

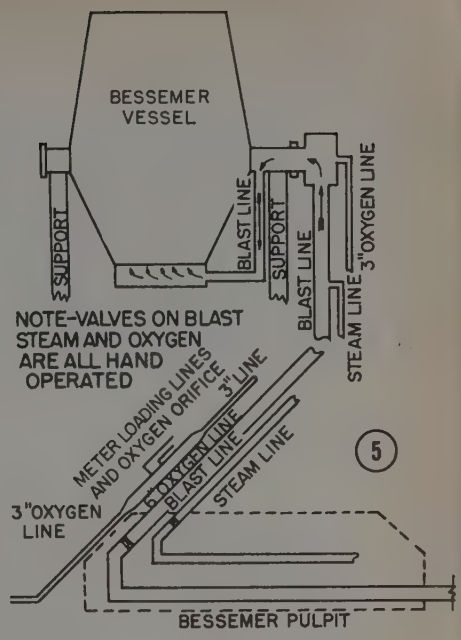
TABLE I

TONS OF OXYGEN APPROXIMATELY REQUIRED FOR ENRICHING THE BLAST OF A BLAST FURNACE BLOWING 70,000 CUBIC FEET PER MINUTE OF WIND

Oxygen Per Cent Content of Blast	Tons of Oxygen Required Per Day
21%	...
22%	60
23%	120
24%	80,700 cfm
25%	84,200 cfm
26%	300
27%	360
28%	420
29%	480
30%	540

TABLE II

70,000 cfm Oxygenated Air (Oxygen Content)	Equivalent Normal Air (Volume)
22%	74,000 cfm
23%	77,500 cfm
24%	80,000 cfm
25%	84,000 cfm
26%	87,500 cfm
27%	91,000 cfm
28%	94,000 cfm
29%	97,500 cfm
30%	100,000 cfm



and advantages of using oxygen on this bessemer operation are summarized as follows:

1. Higher temperature of the molten metal was possible with additions of cold scrap including heavy, large pieces up to 12 per cent of total charge.
2. Greater output was obtained due to reduced blowing time and the statement is made that four bessemer heats could be produced per hour when using oxygen as compared with three heats per hour when not using oxygen. It is also stated that at Maxhuette blast furnace fixed charges were reduced due to greater output so that when using oxygen these fixed costs amount to 4.10 marks as compared with 5.10 marks when not using oxygen. There was also the advantage of approximately 1 per cent greater yield from the bessemer when using oxygen.
3. When using oxygen in the blast a marked improvement was noted in steel quality with the statement that steel made with oxygen enriched blast was superior to the basic bessemer steel made without oxygen. This is attributed to the low nitrogen content of the steel due to the short blowing time and lesser amount of nitrogen in the blast.
4. Use of oxygen made an easier blowing condition on the bessemer and difficulties when using cold metal were practically eliminated when using oxygen.

Oxygen Experimentation At Weirton—Experimental use of oxygen in the bessemer converter was carried on at Weirton during a two-month

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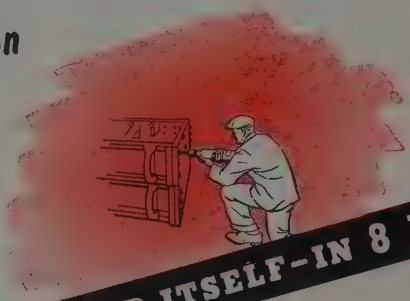

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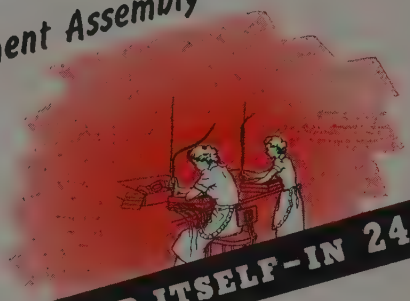

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On Refinery Maintenance Job

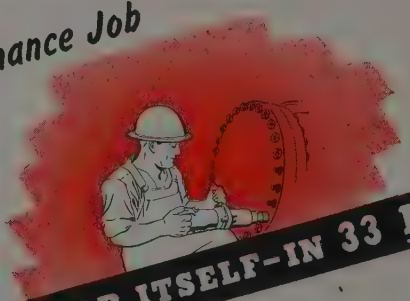

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TABLE III
VOLUME OF BLAST AND VOLUME OF BOSH GAS WITH VARYING OXYGEN ENRICHMENT

Oxygen per cent	Nitro. per cent	Cu Ft[1] per Lb Coke	Cu Ft[2] per Lb Carbon	Relative Driving Rate for Constant Volume of Blast	Factor for Constant Volume Mixture of Bosh Gas	Driving Factor When Maintaining Constant Volume of Bosh Gases from Combustion Zone
21	79	54	71.3	1.0	1.0	1.0
25	75	45.5	60.0	1.19	0.97	1.15
27.5	72.5	41.4	54.5	1.30	0.95	1.24
30	70	37.9	50.0	1.43	0.93	1.33
35	65	32.5	42.8	1.66	0.90	1.49
40	60	28.5	37.4	1.90	0.86	1.64

CO per cent	N_2 per cent	Cu Ft per Lb Coke	Cu Ft per Lb Carbon	Volume Bosh Gas per cfm Wind	Volume Bosh Gas per Constant Volume Wind
34.7	65.3	65.3	86.2	1.21	1.0
40	60.0	56.8	75.0	1.25	1.033
43.2	57.8	52.8	69.5	1.275	1.055
46	54.0	48.9	64.5	1.30	1.075
52	48.0	43.5	57.5	1.35	1.115
57	43.0	39.6	52.3	1.40	1.155

[1]Cubic feet dry air per pound of coke charged; 90 per cent fixed carbon in coke and 84.0 per cent carbon charged assumed to reach tuyeres.
[2]Cubic feet dry air per pound of carbon burned at tuyeres, based on pound mole = 359 cubic feet.

TABLE IV
OXYGEN REQUIRED FOR VARYING ENRICHMENT
(1600 pounds coke per ton pig)

Oxygen per cent	Nitro. per cent	Cu Ft Blast per Lb Coke	Cu Ft of Blast per Ton Iron	Cu Ft of Oxygen per Ton of Iron	Cu Ft of Nitrogen per Ton of Iron	Cu Ft of Air per Ton of Iron
21	79	54	86,500	18,200	68,300	86,500
25	75	45.5	72,800	18,200	54,600	69,100
27.5	72.5	41.4	66,300	18,200	48,100	60,700
30	70	37.9	60,700	18,200	42,500	53,800
35	65	32.5	52,000	18,200	33,800	42,800
40	60	28.5	45,500	18,200	27,300	34,500

Natural Oxygen from Air	Cu Ft of Oxygen from Oxygen Plant	Pounds of Oxygen from Oxygen Plant per Ton of Iron	Cost of Oxygen per Ton of Iron Based on $3.00 per Ton Oxygen Cost
18,200	.....	.....	.....
14,500	3,700	330[1]	$0.495
12,750	5,450	486	0.73
11,300	6,900	615	0.92
9,000	9,200	818	1.23
7,200	11,000	980	1.47

[1]One pound mole or 32 pounds = 359 cubic feet at 32 F and 14.7 psi.
Cu ft oxygen x 32 = pounds of oxygen
359

TABLE V
COMPUTED RELATIONSHIP BETWEEN THE BLOWING TIME AND THE OXYGEN CONTENT OF THE BLAST FOR A BESSEMER CONVERTER

Total Oxygen in the Blast cfm	Oxygen Content of Blast per cent	Total Blast Volume Cu Ft	Blowing Time Min.	Increase in Oxygen Content per cent	Shortening of Blowing Time Min.	Shortening of Blowing Time per cent
3330	21.0	212,000	13.23	.....	.....	.....
3970	25.0	176,500	11.11	19.04	2.12	16.02
4770	30.0	147,000	9.26	42.86	4.97	30.00
5560	35.0	126,000	7.93	66.67	5.30	40.06
6360	40.0	110,400	6.94	90.48	6.29	47.54
7150	45.0	98,500	6.19	114.20	7.04	53.21
7940	50.0	88,300	5.56	138.10	7.67	57.97

period and, as previously stated, the bessemer converters are used for producing blown metal for final refining in open hearth furnaces. The metal is blown down to approximately 1 per cent carbon. Oxygen used was the excess available from four 2-ton per day, 99½ per cent purity oxygen plants which normally supply oxygen to the cutting, welding, and scarfing operations. Maximum amount of oxygen available for the experimental heats at the two 25-ton bessemer converters amounted to 1600 cfm with a blast volume of 32,000 cfm. A maximum oxygen content of 24.7 per cent was possible as compared with the German practice of 30 to 31 per cent which would require 4000 cfm of oxygen for a 25-ton vessel.

Oxygen piping was installed so that it went through the bessemer converter control house where a hand-operated, quick-opening valve was located for easy control by the bessemer blower. The piping after the control valve paralleled the regular air blast piping to the converter connecting into the air blast close to the trunnions with a perforated distribution pipe inside of the air main. Fig. 5 shows diagrammatically this arrangement of piping with control valves and metering. Oxygen pressure at the converter was approximately 20 pounds per square inch.

Oxygen was turned on with the blast as the converter was being rotated upwards at beginning of the heat and in the first series of experiments oxygen was left on during the silicon and carbon blows until the scrap was melted. The color of the flame was different than with air and was characterized by an intense, white glare. In these first experimental heats additional scrap amounting to 20 per cent more than normal was charged and blown metal produced was entirely satisfactory for the open hearth department. Average data on these oxygen heats as compared with normal practice at that time are shown in Table VIII.

Experiments were then made by introducing the oxygen for about 2½ minutes after scrap was melted with no oxygen used during the scrap melt in an effort to lower final silicon and possibly obtain an improved blown metal. As a result of this work, a final series of tests were made with oxygen in the bessemer for three to four minutes during the scrap melting period and one to two minutes at half rate after the carbon blow for final reduction of silicon. These heats were made with a normal scrap charge approximately the same as

EXHIBIT A
BOSH GAS ANALYSES IN FURNACE OPERATION

With Air
$C+O_2+3.8\ N_2=CO_2+3.8\ N_2$ (20.8% CO_2)
$CO_2+C+3.8\ N_2=2CO+3.8\ N_2$ (34.5% CO) (65.5% N_2)

With 25% Enriched Air
$C+O_2+3.0\ N_2=CO_2+3.0\ N_2$ (25% CO_2)
$CO_2+C+3.0\ N_2=2CO+3.0\ N_2$ (40% CO) (60% N_2)
15.7% Increase in CO
8.5% Decrease in N_2

With 27% Enriched Air
$C+O_2+2.7\ N_2=CO_2+2.7\ N_2$ (27% CO_2)
$CO_2+C+2.7\ N_2=2CO+2.7\ N_2$ (42.5% CO) (57.5% N_2)
23% Increase in CO
12% Decrease in N_2

With 30% Enriched Air
$C+O_2+2.33\ N_2=CO_2+2.33\ N_2$ (30% CO_2)
$CO_2+C+2.33\ N_2=2CO+2.33\ N_2$ (46.2% CO) (53.8% N_2)
33.5% Increase in CO
18% Decrease in N_2

EXHIBIT B

Let O=Total amount of oxygen in the blast
N=Total amount of nitrogen in the blast
B=Total amount of blast
M=Total amount of blast per minute
X=Per cent of oxygen in the blast
T=Blowing time in minutes

Then $B=O+N-\frac{(100)\ O}{(X)}$

And

$$N=B-O=\frac{(100)\ O}{(X)}-O=\frac{(100-1)=O}{(X\ )}\ \frac{(100-X)}{(X\ \ X)}$$

$$=O\frac{(100-X)}{(\ X\ )}$$

Also $T=\frac{B}{M}=\frac{O}{M}+\frac{N}{M}=\frac{O}{M}+\frac{N}{M}=\frac{O}{M}+\frac{(O)}{(M)}$

$$\frac{(100-X)}{(\ X\ )}=\frac{O}{M}\ \frac{(1+100-X)}{(\ \ X\ \ )}=\frac{O}{M}$$

$$\frac{(X+100-X)}{(\ \ X\ \ )}=\frac{O}{M}\ \frac{(100)}{(X)}$$

If O is constant then (T) (X) is also constant.
$\frac{}{M}$
Therefore if the values of T are plotted as abscissae and the values of X as ordinates the curve (T) (X) = constant will be a hyperbola lying within the practical limits of available oxygen, namely X=21 and X=100.

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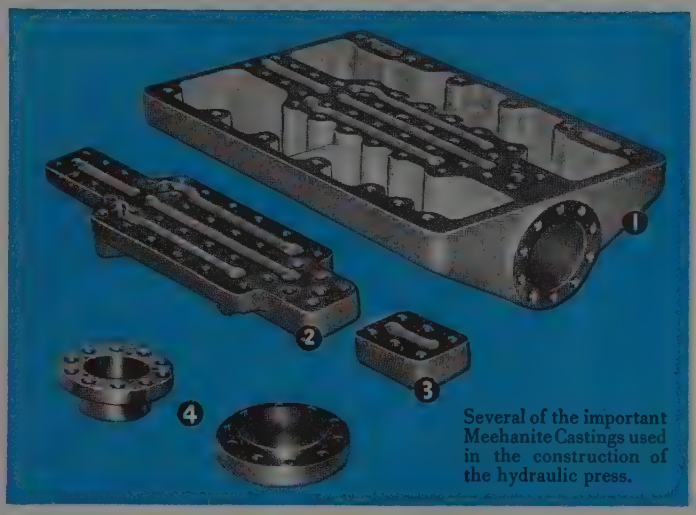
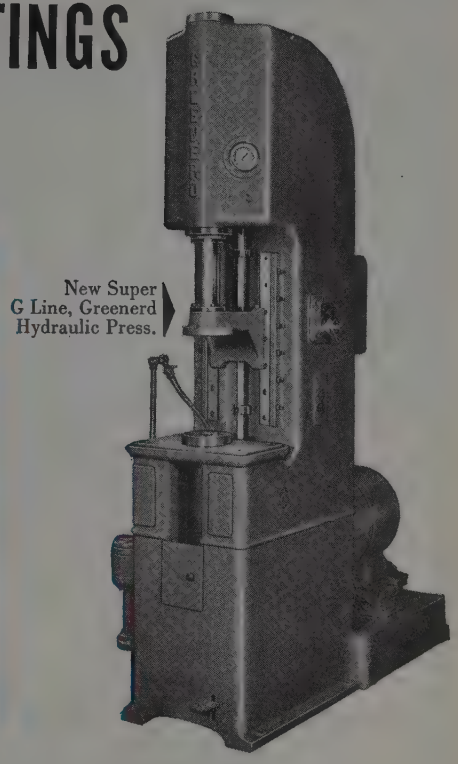


Several of the important Meehanite Castings used in the construction of the hydraulic press.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2. Manifold
3. Manifold cap
4. Bottom and top caps
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For further information write for Bulletin No. 28 "7 Questions and Answers about Meehanite Castings."

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TABLE VI

EFFECT OF OXYGEN ADDITION TO AIR BLAST UPON BLOWING TIME OF BESSEMER CONVERTER

Blast Volume Total Cu Ft	Cu Ft Per Min.	Oxygen Added Cu Ft	Oxygen in Blast per cent	Blowing Time Min.	Oxygen Used During Blow cfm
198,300	16,200	.....	21.0	12.25	3450
137,700	15,300	16,780	30.4	8.97	4770
121,700	18,030	22,050	35.1	6.75	6430

TABLE VII

AMOUNTS OF STEEL SCRAP USED WITH DIFFERENT OXYGEN CONTENTS IN AIR BLAST TO A BESSEMER CONVERTER

Oxygen Content of Blast	Pig Iron Charge	Steel Scrap Consumption	Total Charge
per cent	Lbs	Lbs	Lbs
21.0	47,700	1760	50,200
30.4	43,800	7720	52,300
35.1	44,500	7280	52,500

TABLE VIII

OXYGEN TEST ON BESSEMER CONVERTER

Charge (Lbs):	Without Oxygen	With Oxygen
Hot Metal	45,000	45,333
Scrap	7,000	8,416
Total	52,000	53,750
Blow Time (Min.)	10	7½
Oxygen Used (Cu ft)	.....	6,937
Time Oxygen (Min.)	.....	4-26"
Oxygen (Cu ft per Min.) .	.....	1,563
Prod. (Tons per Min.)	2.6	3.58

Remarks: Average practice without oxygen. Increase 37.5 per cent tons per minute.
Oxygen content of blast approximately 24.7 per cent. 258 cu ft of oxygen per ton of blown metal.

when blowing air and results of this series of tests are shown in Table IX.

In regard to the life of converter lining and bottom, the experimental work with oxygen showed that bottom loss amounted to ½-in. per blow which is the same as with normal air with an average of 40 heats produced per bottom. Amount of oxygen used showed no adverse effect on the lining with a tendency to keep the lining clean of silicon skulls. The normal lining life averages approximately seven weeks or 66,000 tons of blown metal. When the new 400-ton plant is installed, full scale production experiments will be made with oxygen up to about 35 per cent enrichment and varying the time of usage to definitely determine best oxygen practice for the bessemer converter.

Oxygen Valuable In Open Hearth—From information obtained to date we can definitely say that use of oxygen in the open hearth fuel burner is of greater advantage for an open hearth practice using a high scrap charge as compared with one using a high iron charge. For example, an open hearth charge consisting of 65 per cent scrap and 35 per cent hot metal will show greater benefits from oxygen in the burner than could be obtained when using a charge consisting of 35 per cent scrap and 65 per cent hot metal. Results will vary considerably due to

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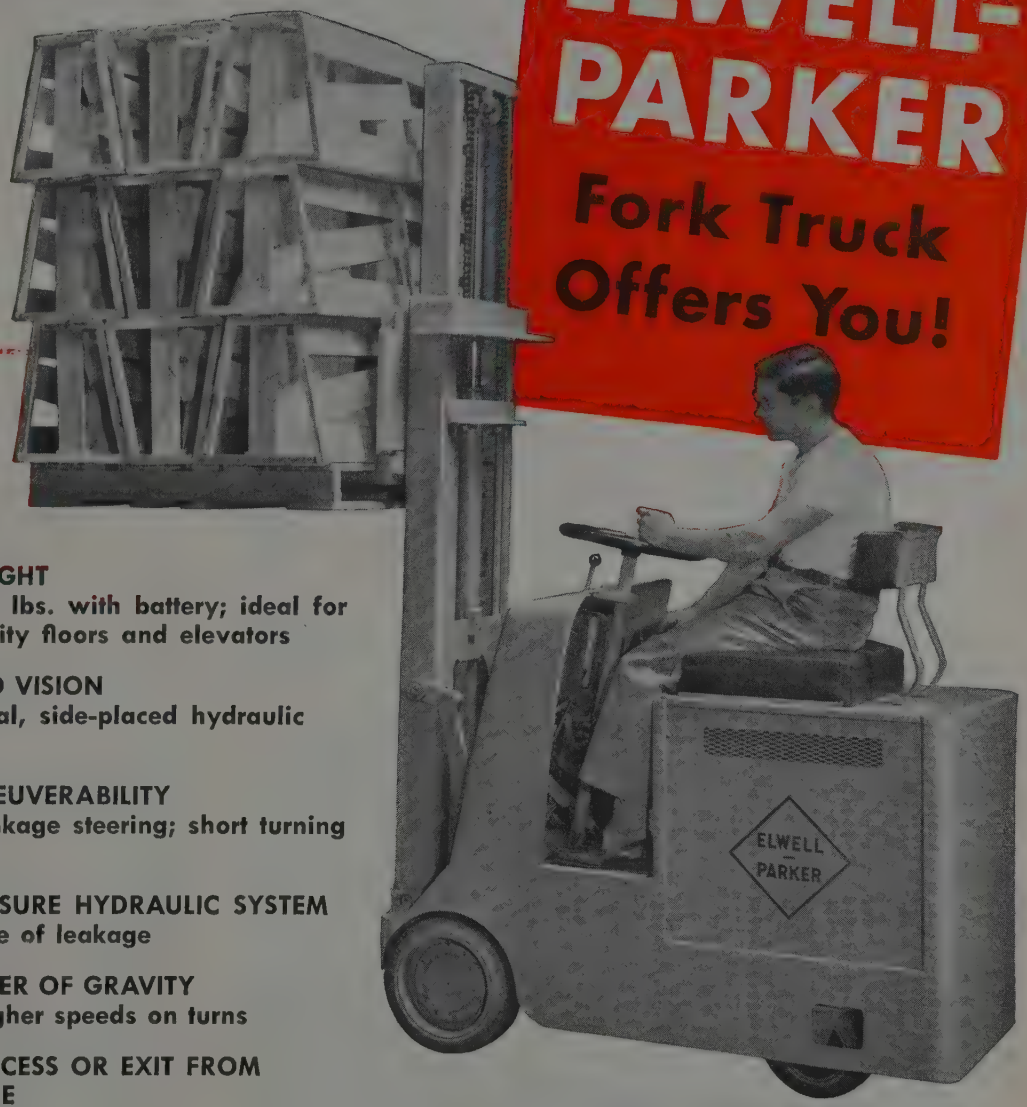

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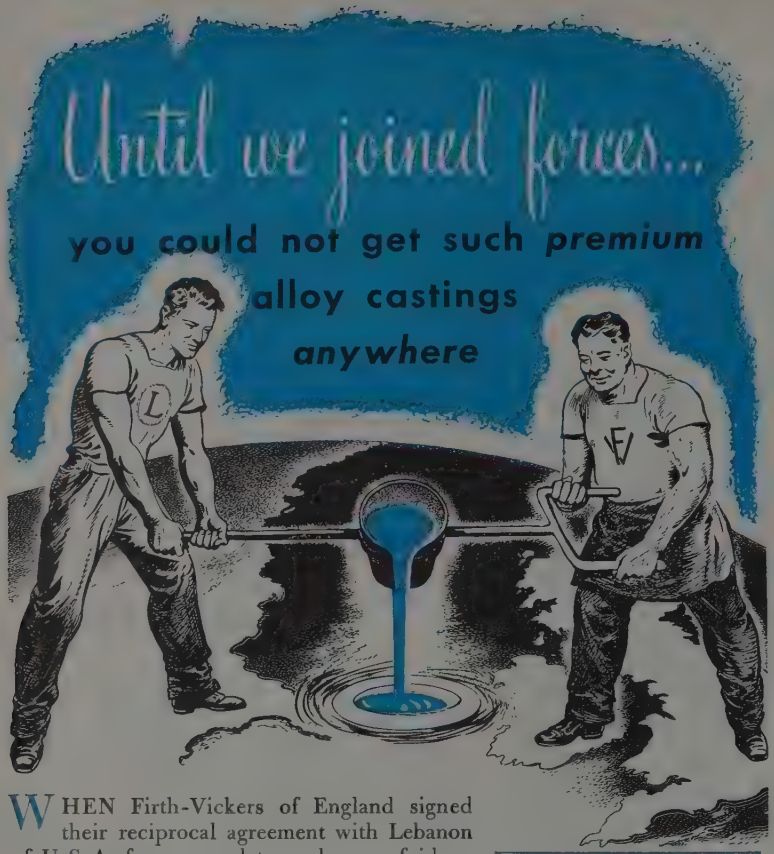

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LEBANON ALLOY AND STEEL **Castings**

CIRCLE L

TABLE IX

OXYGEN TEST ON BESSEMER CONVERTER

	Without Oxygen	With Oxygen
Charge (Lbs):		
Hot Metal	45,500	45,917
Scrap	9,000	9,000
Total	54,500	54,917
Blow Time (Min.)	9	6.34
Steam on with oxygen (Min.)	.....	1.62
Oxygen Used (Cu ft)	.....	5,950
Time Oxygen (Min.)	.....	4
Oxygen (per Min.)		1600-3 800-1
Prod. Tons (per Min.)	3.00	4.33

Remarks: Average practice with oxygen. Increase 42.9 per cent tons per minute.
216 cu ft oxygen per ton of metal.

TABLE X

	Fuel Oil at 5c Per Gallon	Fuel Oil at 10c Per Gallon
Size of heat—tons	200	200
Oxygen used per heat—tons	6	6
Fuel oil saving at three gallons per ton—gallons	600	600
Cost of oxygen per heat	$30.00	$30.00
Saving in fuel oil per heat	$30.00	$60.00
Net saving per heat	.....	$30.00
Net savings per ton of ingots	.....	$ .15
Increased rate of production	20%	20%

TABLE XI

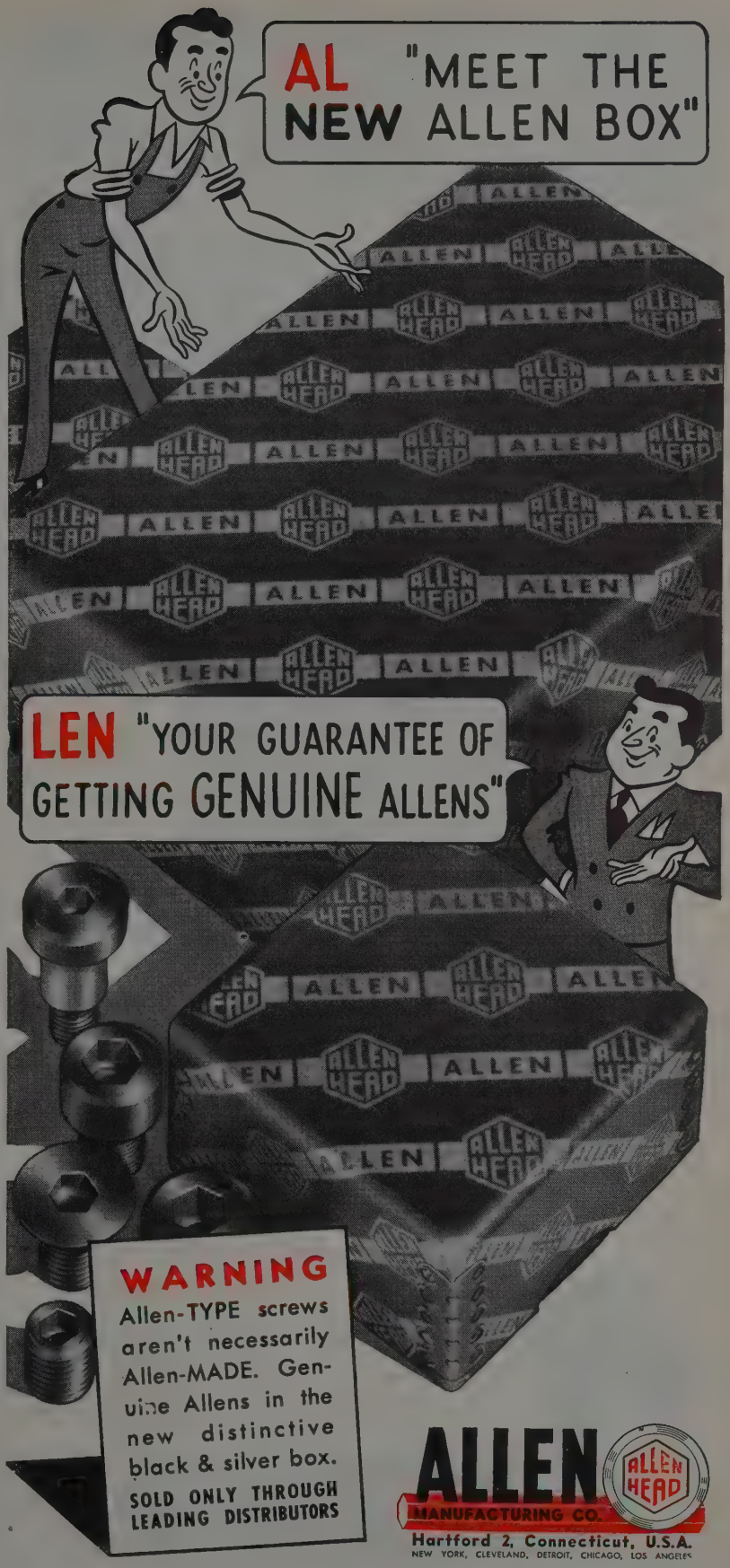
	Oil Fired	Combination Oil and Gas Firing
Size of heat—tons	200	200
Heat consumption per ton of ingots—Btu.	3,700,000	4,000,000
Fuel oil required per ton—gallons	25.5	12.5
500 Btu gas required per ton—cubic feet	.....	4250
Cost of fuel oil per ton	$ 2.55	$ 1.25
Cost of gas	.....	$ .75
Total fuel cost	$ 2.55	$ 2.00
Fuel saving—per ton	.....	$ .55
Amount of oxygen required—tons	.....	6
Cost of oxygen at $5.00 per ton	.....	$30.00
Cost of oxygen per ton of ingots	.....	$ .15
Net saving in fuel cost minus oxygen cost—per ton	.....	$ .40
Production rate — tons per hour	15	15

furnace size and shop layout. Some plants have tried the use of oxygen in checker chambers for enriching the main air supply to the furnace. Results are not as good as when applying oxygen directly in burner.

In the case of our experiments at Weirton with an open hearth furnace making 210-ton heats the amount of fuel oil burned during the scrap melting period increased from a normal of 480 gallons per hour when not using oxygen up to 700 gallons per hour when using approximately 900 cfm of oxygen in the burner. Time of heat from charge to tap was shortened from a normal of 14 hours down to 10 hours with a corresponding increased production rate of 21 tons per hour as compared with a normal rate of 15 tons per hour. The percentage increase in production rate amounted to 40 per cent and the fuel consumption was lowered by 17 per cent, equivalent to a net saving of five gallons of fuel oil per ton of ingot production. The total oxygen used during a he

amounted to about eight tons spread over a period of four hours. These results were obtained with one furnace only using oxygen in a 12-furnace shop so that benefits possible with a larger number of furnaces using oxygen would probably not be as great as obtained from this one furnace experiment. This is primarily due to present limitations of charging equipment for getting scrap into the furnace as fast as it can be melted with an oxygen accelerated flame. This condition probably exists in practically every open hearth shop at the present time. It is possible in the future that scrap charging facilities can be improved so that full advantage of the fastest possible melting time can be obtained. Some thought is being given to melting of scrap in a separate furnace by the use of oxygen and the charging of this molten scrap into the open hearth in order to minimize the scrap charging time. However, for the immediate future, taking into consideration limitations of charging facilities and present day refractories obtainable, a more conservative usage of oxygen will probably still result in an appreciable increase in open hearth production with a moderate fuel saving. In the case of a 200-ton open hearth furnace, the use of about 600 cfm of oxygen during the scrap melting period (approximately four hours) should produce an increase in open hearth furnace production of about 20 per cent with a 10 to 15 per cent decrease in fuel consumption. This practice would require about six tons of oxygen per heat of steel or 720 cubic feet of oxygen per ton of ingots. Economics of this proposed practice, based on an oxygen cost of $5.00 per ton, is compared in Table X with fuel oil priced at both 5c and 10c per gallon.

Combination Firing Offers Savings—With increased cost of liquid fuels it is highly possible that oxygen can be used extensively with gaseous fuels or a combination of gaseous and liquid fuels so that the high flame temperatures and tonnage rates possible with straight liquid fuels can be maintained. Use of straight liquid fuels as compared with a combination of liquid and gaseous fuels has in the past shown that an increase of 7 to 8 per cent in ingot production is possible. Ability to maintain this production rate with combination firing with the help of tonnage oxygen should show attractive savings with fuel oil at 10c per gallon (66.7c per million Btu) and with gaseous fuels priced at 35c per million Btu. Table XI is an analysis of this proposed practice.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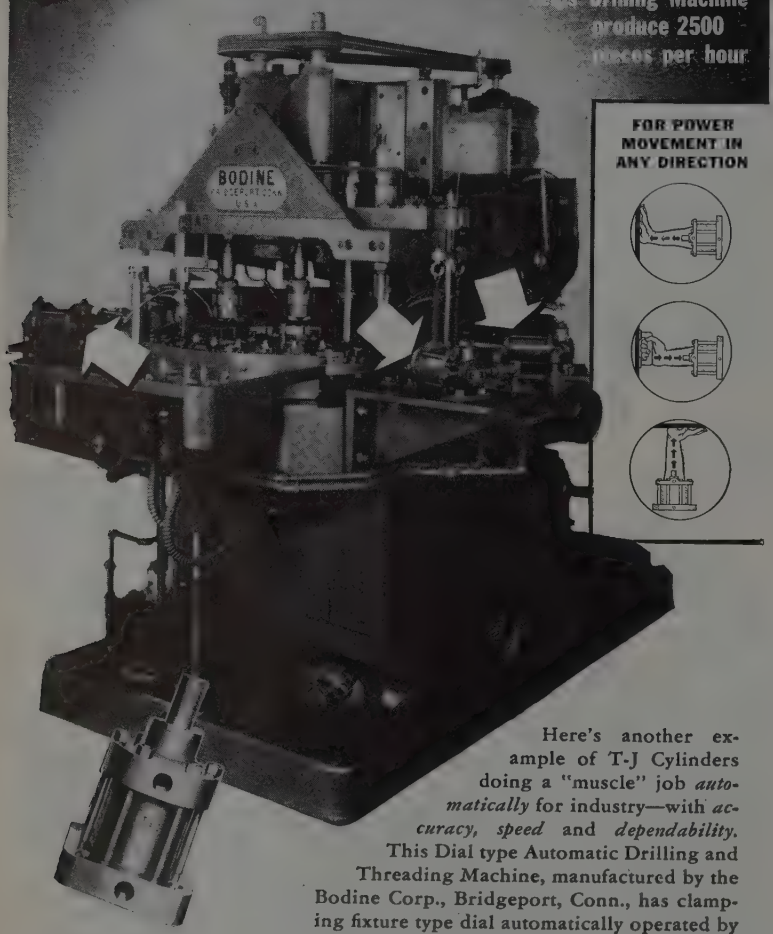

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ASM Technical Papers

(*Continued from Page* 147)

fully killed alloy steel ingots for gun tubes (mostly basic openhearth S.A.E. 4340) were studied by metallographic methods and by the petrographic examination of inclusions obtained by acid extraction.

The average inclusion content of the nine ingots varied from 0.0055 to 0.0285 per cent. There was no consistent trend in the distribution of inclusions in the ingots. However, the inclusion content was usually higher in the edge positions, particularly toward the top of the ingot. The inclusions in the bottom portion of the ingot were predominantly of the alumina type, and toward the top portion were predominantly of the silicate and oxide glass type. In some ingots, the size of sulphides increased toward the top of the ingot, and the size of oxides and silicates increased toward the bottom of the ingot.

Density Variations in Some Killed Steel Ingots

By C. F. Sawyer, plant metallurgist, Vanadium-Alloys Steel Co., and J. W. Spretnak, member of staff, Metals Research Laboratory, Carnegie Institute of Technology

The density was determined for steel samples from 33 different locations in each of five fully killed alloy steel ingots for gun tubes (mostly basic openhearth S.A.E. 4340). The average density varied from 7.711 to 7.838 at the different locations. The variations in density indicated differences in the extent of microshrinkage during solidification of the ingots. The samples of lowest average density were from the region of the secondary pipe in the central portion of the top two thirds of the ingots. The top two thirds of the ingots, where the density of the center has the lowest average, gave the highest yield of pierced seamless gun tubes free from bore defects or quench cracks.

Factors Affecting Subsurface Defects in Forging—Steel Ingots

By E. A. Loria, fellow, Mellon Institute of Industrial Research, and H. D. Shephard, metallurgical engineer, Kerchner, Marshall & Co.

Several large forging ingots of S.A.E. 1040 acid openhearth steel were examined by means of transverse macro-etch tests, sulphur prints, magnetic particle inspection, and microscopy in an effort to determine the factors affecting the formation of subsurface cracks, subsurface porosity and other defects caused by the presence of nonmetallic inclusions. Flaking was not studied.

Subsurface cracks in forging ingots are initiated by segregated nonmetallic inclusions. During forging,

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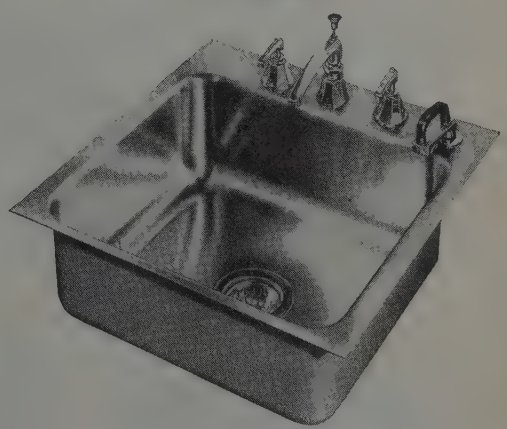

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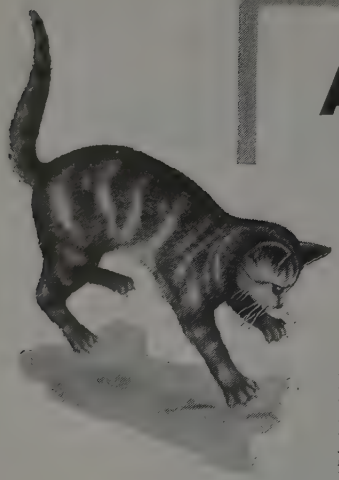

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UNITED STATES STEEL

the steel cracks because of decreased crystal-to-crystal cohesion when inclusions form continuous layers of liquid at forging temperatures.

On the machined surface of round forgings small seams exposed by magnetic particle inspection of the periphery, after machining 1½-inch below the surface of the original ingot, arise from stringer-type inclusions. General trends of inclusion distribution in the microscopic examination of the top, middle, and bottom transverse sections of several 36-inch forging ingots are presented. Sulphur prints reveal the segregation of inclusion stringers within the outer (chill) zone of forging ingots. These stringers are interspersed among an otherwise even distribution of minute sulphides.

Microstructure and Mechanical Properties of Cast Steels

By M. F. Hawkes, assistant professor of metallurgical engineering and member of staff, Metals Research Laboratory, and B. F. Brown, graduate student, Carnegie Institute of Technology

Cast steels exhibit a variety and complexity of structures not observed in comparable wrought steels similarly treated. The authors studied the microstructures of many plain carbon, low-alloy and medium-alloy cast steels after various annealing and normalizing treatments. The temperature at which austenite transforms to ferrite on cooling is the fundamental variable controlling the microstructure.

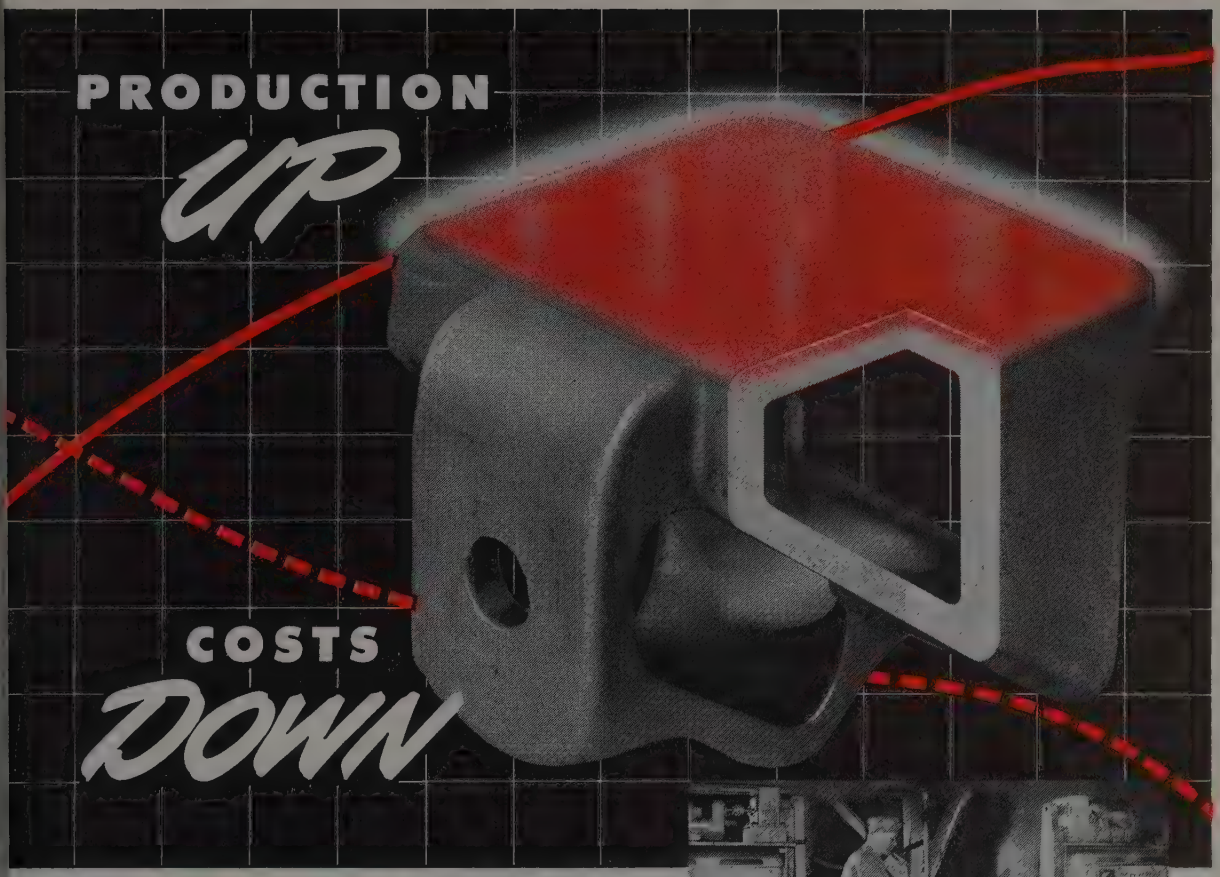
As this temperature is lowered by virtue of increased cooling rate or hardenability, the structures observed are successively: (a) Dendritic blocky ferrite plus pearlite, (b) random blocky ferrite plus pearlite, (c) Widmanstatten ferrite plus pearlite, (d) Widmanstatten ferrite plus martensite, and (e) martensite.

The mechanical properties of seven heats of cast steel were studied intensively. The properties of each heat were reported graphically by plotting each property as a function of the tensile strength.

Effect of Vanadium on the Properties of Cast Carbon, Carbon-Molybdenum Steels

By N. A. Ziegler, research metallurgist, W. L. Meinhart, assistant research metallurgist, and J. R. Goldsmith, metallurgical engineer in charge of research foundry, Crane Co.

In the paper, the influence of vanadium is reported for three types of cast steel: (a) carbon steel, (b) 0.5 per cent Mo steel, and (c) 1 per cent Mo steel. In each of these steels the vanadium content was varied from 0 to 0.3 per cent and the carbon content from 0.05 to 0.3 p



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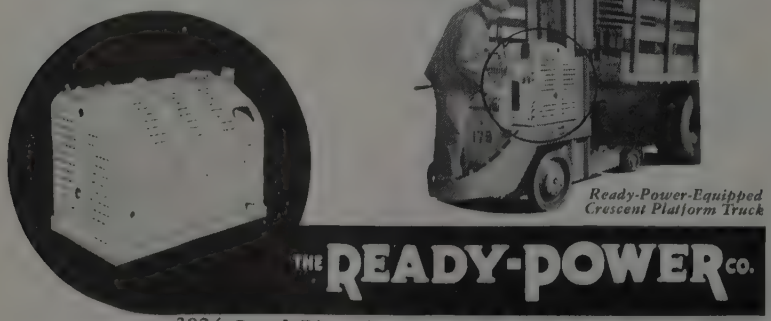

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cent. Numerous dilatometer curv are presented.

Thermal sluggishness—studied latometrically and metallographica —was increased by the combined fects of carbon, molybdenum a vanadium, but not by vanadium alo in the carbon steels.

Vanadium moderately increases t tensile strength, yield point, p portional limit and hardness, sligh reduces the ductility and to a c siderable extent, reduces the impa resistance.

Metal-arc welding of these ste presented no difficulties with rega to cracks and voids. However, d tility of the resultant weld asse blies was decreased by the combi effect of carbon, molybdenum a vanadium.

Vanadium-bearing steels in the cast condition are more brittle th similar compositions without vana ium. When the steels are prope heat treated, this brittleness is eli inated, but impact resistance is low and greater care is required th for carbon and carbon-molybden steels.

Influence of Low Temperatures on Mechanical Properties of Stainless

By D. J. McAdam, Jr., metallurgist, W. Geil, metallurgist, and Frances J Cromwell, metallurgist, National Bureau Standards

Tensile tests were made on modifications of wrought 18-8 sta less steel. Some of the steels w annealed, some cold drawn, and c alloy with 0.7 per cent Ti and per cent Al was percipitation ha ened.

Load-extension diagrams and t stress-strain curves are presented tests at room temperature —78° (—108° F), and —188° C (—306° Some of the curves are influen greatly by the phase change fr austenite to ferrite (martensite) t occurred during plastic deformati The rapidity of this change increa with decrease in temperature. low temperatures, the harden caused by the phase change is rapid that the load-extension cu sometimes has two maximums.

The variation of strength w temperature is also considered. brief investigation was made of influence of circumferential V-no es on the tensile stress-strain cur for two of the steels.

Basic Reasons for Good Machinability of "Free Machining" Steels

By M. Eugene Merchant, physicist, an Zlatin, research engineer, Cincinnati ing Machine Co.

These treatments are known to prove the machinability of st (a) Addition of sulphur; (b) a

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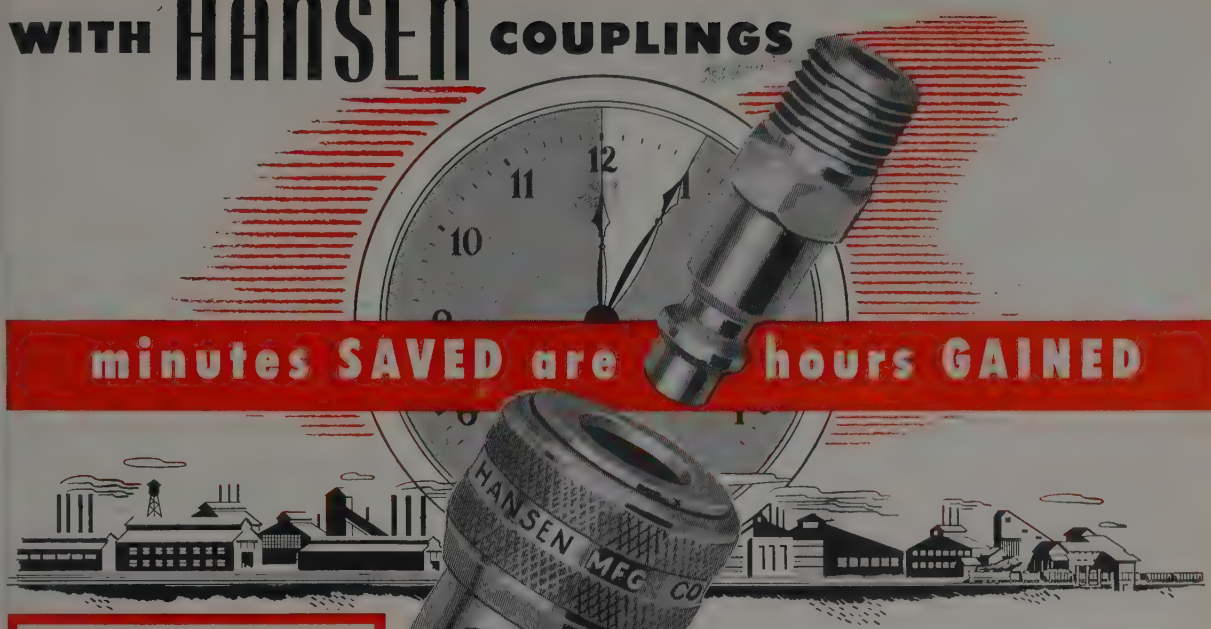

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tion of lead; (c) addition of sodium sulphite; and (d) cold working.

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Mechanical Properties in Heat Treated Wrought Steel

By Cyril Wells, Metals Research Laboratory, and R. F. Mehl, director, Metals Research Laboratory, Carnegie Institute of Technology

Average, variation, and degree of control of each of the properties—transverse reduction of area, transverse impact, and yield strength—have been determined for several units of heat treated wrought steel products. These units vary considerably in size: Minimum, a part of a single tube or forging; maximum, several hundred tubes or forgings. Based on the quality and degree of control of quality observed per unit, specifications which operate more efficiently and economically for the acceptance of tubes for certain purposes have been developed.

Studies have been made of the effect on transverse ductility of (a) size of ingot, (b) forging reduction, (c) yield strength, (d) reheat treatment, and (e) non-metallic inclusions. Relations between transverse reduction of area and transverse impact and between transverse impact and yield strength have been determined as has also the relation of angle between longitudinal axis and flow line direction in specimens to mechanical properties.

Significance of angular fracture and of porosity resulting from deep acid etching in relation to transverse reduction of area quality are discussed and evaluated.

Resistance to Sensitization of Austenitic CL-N: Steels of 0.03% Max. Carbon

By O. W. Binder, metallurgist, C. M. Franks, chief metallurgist, Electro Metal-Carbon Research Laboratories, and Russell Franks, chief metallurgist, Electro Metallurgical Co.

A basic study of low-carbon austenitic chromium-nickel steels was made to determine the effect of chromium, nickel, carbon, and nitrogen on their susceptibility to intergranular corrosion. The compositions investi-

gated from 16 to 25 per cent chromium, 6.5 to 25 per cent nickel, 0.005 to 0.05 per cent carbon, and 0.002 to 0.15 per cent nitrogen. Additions of up to 3 per cent molybdenum and small amounts of columbium were also investigated.

Complete immunity is essential to the successful service of steel exposed at elevated temperatures for long periods of time. This work substantiates the viewpoint that carbon must be lowered to at least 0.02 per cent if the steels are to be completely free of susceptibility to intergranular attack. The proper addition of columbium to steels of somewhat higher carbon content for complete immunity to intergranular attack must allow for its solubility in the steel and for its combination with carbon and nitrogen.

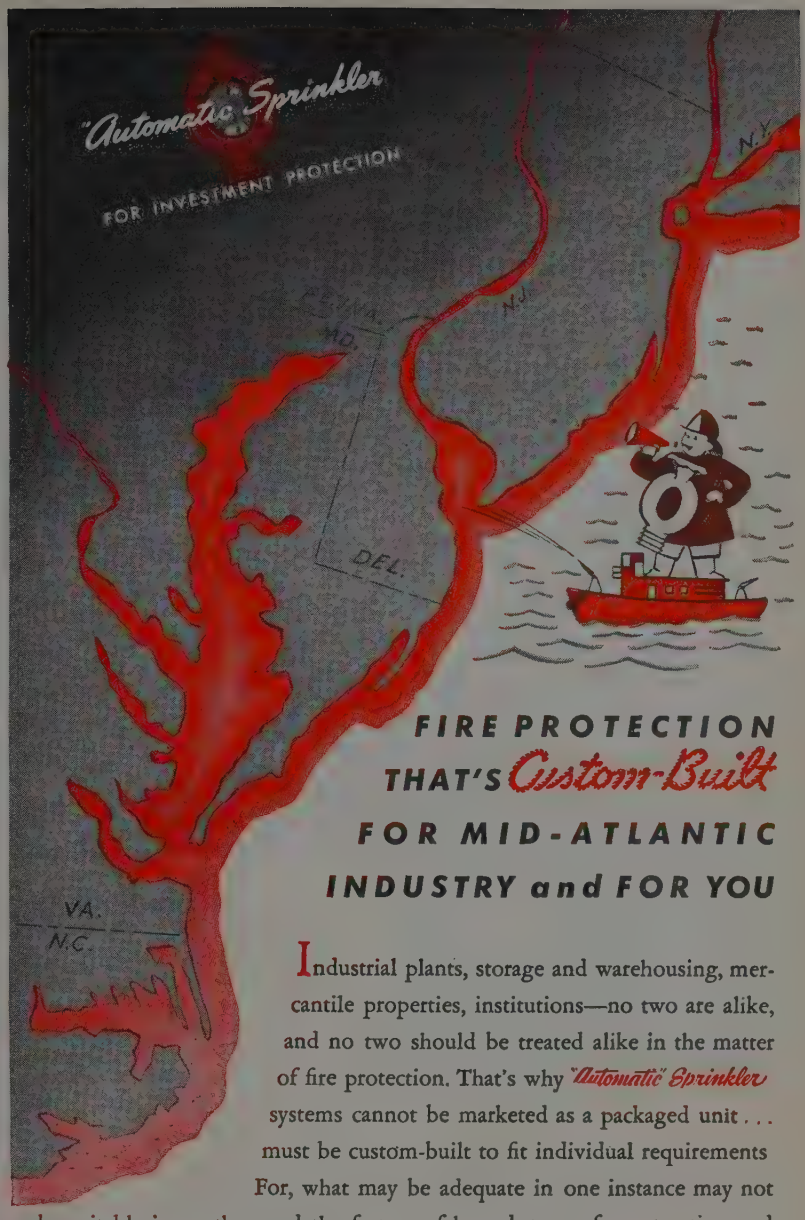
Steels subjected to high temperatures only during fabrication require somewhat less than complete immunity to intergranular corrosion that more extended heating demands. The effects of composition on the resistance to attack after short periods of heating at 650 and 750° C (1200 and 1380° F) have been summarized in empirical formulas. The study of the time-temperature-precipitation relationship was extended to steels containing molybdenum.

Mechanism of Rapid Oxidation of Alloys Containing Molybdenum

By W. C. Leslie, research fellow, and M. G. Fontana, professor and chairman, department of metallurgy, Ohio State University

The unusually rapid oxidation at high temperatures of 16 per cent chromium, 25 per cent nickel, 6 per cent molybdenum alloy and similar alloys containing over 3 per cent molybdenum and a considerable proportion of iron has been investigated. The structure and composition of the oxide and the microconstituents of 16-25-6 have been studied. A survey has been made of the effects of the more volatile metal oxides on the oxidation of various metals and alloys. The effects produced on the rapid oxidation of 16-25-6 by changes in the alloy composition, by stress, surface finish, coatings, and circulation of the oxidizing atmosphere have been studied.

Rapid oxidation of the alloy has been found to be due to accumulation of gaseous MoO_3 on the metal surface, and the rate of oxidation is accelerated by a thermal dissociation of MoO_3 at temperatures above about 1500° F (815°C). The reaction can be prevented by movement of oxidizing gases across the surfaces of the alloy. Stress, surface finish, surface coatings of other metals, and minor changes in composition of the alloy have little or no effect on



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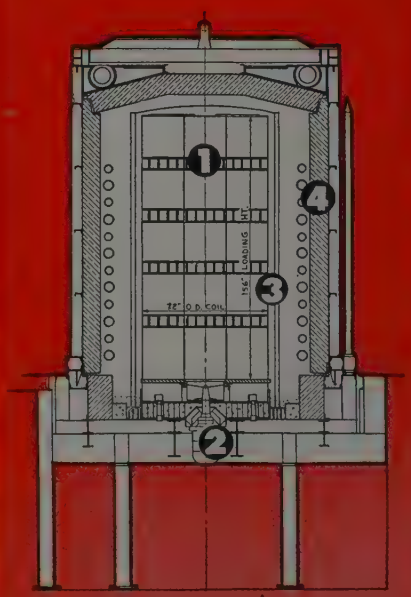

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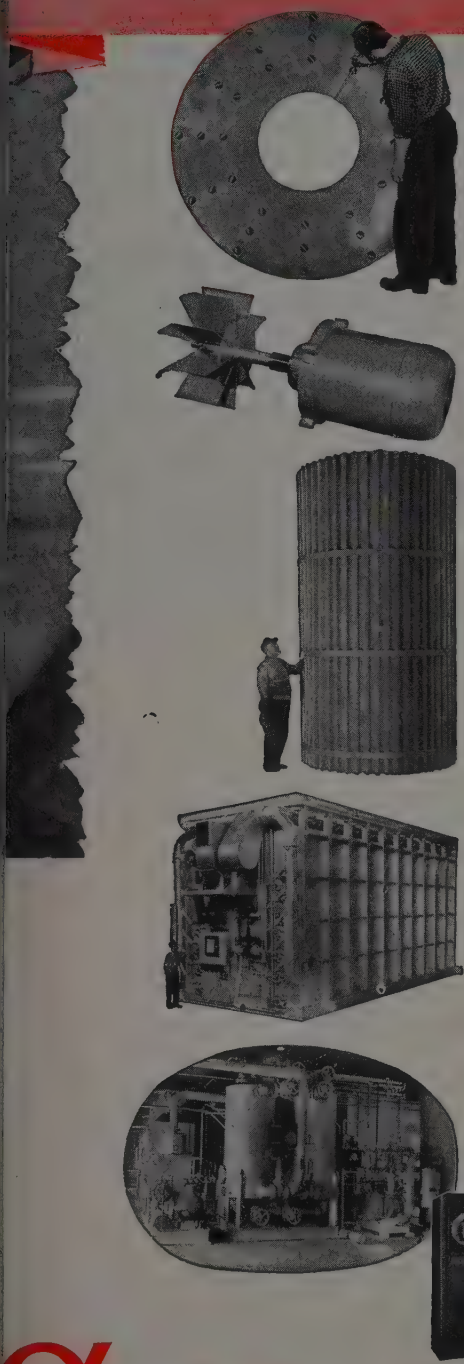

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1. **COIL SEPARATOR** ● Of simple, rugged construction for balanced convection heating and cooling. Directs rapidly circulated heating and cooling gases to the ends of the coil laminations thereby utilizing solid metal heat transfer, rather than conduction through laminations.

2. **HIGH POWERED BASE FAN** ● 'Surface' design. Power input ten times greater than used formerly. Incorporates a unique method of sealing annealing atmospheres against differential pressures.

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4. **RADIANT TUBE HEATING COVER** ● Stepped-up useful heat input of 'Surface' Radiant Tubes balances the fast heat absorption rate of the new deep-corrugated inner covers and fast heat transfer of base fans and coil separators.

Two additional 'Surface' developments assure 'Quality Control' of heat treated products.

5. **NX ANNEALING ATMOSPHERE GENERATOR** ● Furnishes a gas atmosphere environment for the steel, producing the highest quality electrolytic tin plate. Tin plate annealed in 'Surface' NX Gas Atmosphere shows higher corrosion resistance, more uniform plating, and fewer plating defects.

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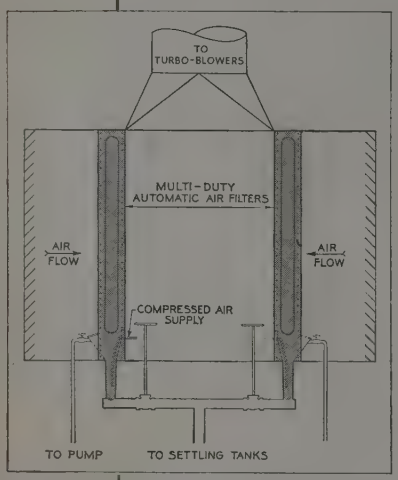

The AAF Multi-Duty is an automatic self-cleaning air filter. Overlapping panel construction of the filter curtain combines positive self-cleaning and high efficiency air cleaning as integral functions of the operating cycle. Uniformly constant air supply is assured as operating resistance remains fixed when once established for a given dust concentration.

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the oxidation when gaseous molybdenum oxides are present.

The microconstituents of 16-25-6 are composed of nitrides as well as carbides. No evidence has been found of the formation of sigma phase (FeCR) in this alloy. A surface carburization accompanies the rapid oxidation.

Stabilization of Austenitic Stainless Steel

By Samuel J. Rosenberg, senior metallurgist, and John H. Darr, scientific aid, National Bureau of Standards

A study was made of the resistance to intergranular attack of twenty-three 18 per cent Cr-10 per cent Ni austenitic corrosion resisting steels in different initial conditions. Susceptibility to intergranular attack was determined after seven sensitizing treatments, followed by exposure for a maximum of 14 days in a boiling acidified copper sulphate solution.

It was found that maximum susceptibility to intergranular attack was developed by sensitizing either 8 or 21 days at 1020° F (550°C). The straight carbon austentic steels were quite vulnerable to attack, although decrease in carbon content decreased the degree of vulnerability.

Columbium-and titanium - treated steels were satisfactorily resistant to attack, provided the Cb/C or Ti/C ratios were sufficiently high. These ratios varied, depending on the initial condition of the steel. The carbon content of the treated steels had no influence upon the resistance to intergranular attack, the predominating factor being the Cb/C or Ti/C ratio.

Dilatometric Effects of Hardening, Recrystallization

By C. H. Samans, chief, metallurgical section, Research Laboratory, C. C. Brayton, technical assistant, H. L. Drake, technical assistant, and L. Litchfield, technical assistant, American Optical Co.

Using the Chevenard differential method, dilatometric studies were made up to 800°C (1475°F) on specimens of the 60 copper-20 nickel-20 manganese alloy after various thermal and mechanical treatments. The nature of discontinuities found in instantaneous co-efficient of thermal expansion versus temperature curves was investigated further by electrical resistance measurements up to 620° C (1150°F), and by rockwell C hardness measurements after heating for constant short times over the entire range of temperatures or for varying times at several constant temperatures. Metallographic evidence also is presented.

These discontinuities are explained satisfactorily on the assumption of

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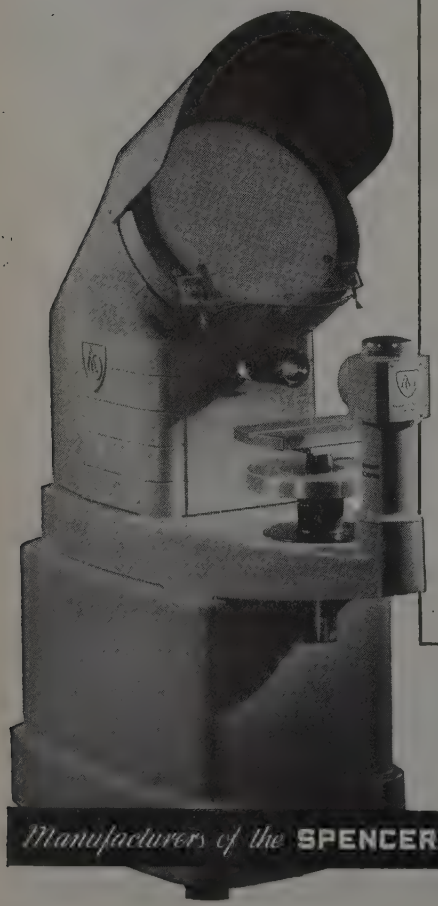

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the successive formation in the stable solid solution, with increasing temperature, of (a) a low temperature, ordered face-centered tetragonal structure, the most compact; (b) an orthorhombic structure, somewhat less compact; and (c) a high temperature, disordered solid solution, all of copper in MnNi. The hardening is attributed to the effect of the face-centered tetragonal structure, and the minimum conductivity to a balance between the orthorhombic structure and the concentration change in the solid solution. The effect of cold work is to decrease the tendency toward ordering and so to cause the hardening to take place at a higher temperature than in the unworked alloy, after recovery has removed some of the effects of the deformation. The temperature of most rapid recrystallization is shown to be about 525° C (980°F) and to follow, at least approximately the temperature of disordering or resolution.

Nickel-Base Alloys for High Temperature Applications

By A. G. Guy, associate professor of mechanical engineering, North Carolina State College

Information is given on a new series of cast, nickelbase high temperature materials containing aluminum, molybdenum and chromium as the principal alloying elements. Rupture test data at 1500°F (815°C) show that a number of the alloys in the series have higher rupture strengths than the best of the cobalt-base materials now in use.

High Temperature Deformation Characteristics of Several Sheet Alloys

By James Miller and Glen Guarnieri, research metallurgists, Cornell Aeronautical Laboratory

From short-time constant rate tensile tests at elevated temperatures true stress-true strain characteristics have been determined for five different types of alloys over a range of temperatures and strain rates. The alloys were selected to include SAE 1020 steel as a reference material; regular Inconel to represent a comparatively stable annealed material; Inconel X, a fully-aged alloy; and S-816, both annealed and cold-rolled, to represent an alloy susceptible to age hardening in both the annealed and cold-rolled conditions.

An attempt was made to use the data as a means of learning more about the mechanics of deformation at elevated temperatures through determination of the activation energies involved. The increase in such energy values with decrease in stress, as was found for all materials, was attributed to the effect of elastic

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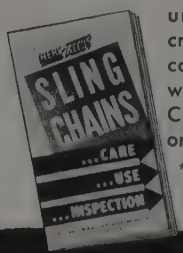

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distortion on the crystal lattice. A simplified mechanism of deformation is described.

Stability of Steels at Elevated Temperatures

By A. B. Wilder, chief metallurgist, Pittsburgh Works, and J. O. Light, chief metallurgist, Lorain Works, National Tube Co.

Stability of over one hundred different types of steel at 900, 1050 and 1200° F (480, 565 and 650° C) is being evaluated over a period of 11 years. Welded samples are included in the investigation. The results obtained in an examination of twenty of these steels for evidence of structural changes, oxidation characteristics and impact properties after exposure for 10,000 hours are presented.

The influence of zirconium, columbium and titanium on graphitization in molybdenum-bearing steels without chromium is discussed. Graphite observed in zirconium-molybdenum steel in the weld heat-affected zone was associated with a grain boundary phenomenon and, in some respects, was similar to chain graphite. Graphite was also observed in the zirconium and molybdenum steels. The Charpy impact properties of the zirconium steels were not appreciably changed by graphitization, but these steels were severely oxidized and decarburized at 1200° F (650° C).

Microstructure of the 12 per cent chromium ferritic stainless steels was essentially unchanged after exposure. Oxidation of these steels after exposure was nil and the Charpy impact properties are being further investigated before definite conclusions are presented. The microstructure of the 17 per cent chromium steel was not appreciably changed, but after 10,000 hours at 1200° F (650° C) a new constituent near the weld metal-base metal interface was observed which may be sigma phase, due to alloy diffusion. Further testing will be required to establish definite conclusions.

The 18 per cent chromium—8 per cent nickel, 18 per cent chromium—8 per cent nickel free machining (18-8 FM), and 18 per cent chromium—8 per cent nickel-molybdenum steels were observed to contain carbide precipitation at the grain boundaries after exposure, which resulted in lowering the Charpy impact strength.

Theory of Diffusion in Formation of Alloys in Powder Metallurgy

By Pol Duwez, associate professor of mechanical engineering and chief of Materials Section of Jet Propulsion Laboratory, and Charles B. Jordan, research engineer, Jet Propulsion Laboratory, California Institute of Technology

A simple theoretical discussion is first given, by means of which it is

possible to predict approximately the time and temperature required for complete homogenization by diffusion of a mixture of two metal powders. The theory is first developed for one-dimensional diffusion in a stack of interleaved thin sheets of two metals, which arrangement has recently been investigated in France by Chevenard and Wache. With the aid of an analysis by Weinbaum of diffusion in a simple model of a mixture of powders, it is then shown that the method of predicting time and temperature of homogenization can be extended to this three-dimensional case. The method involves only consulting a pair of charts which are given; no calculations are necessary.

An experimental investigation of the progress of diffusion in compacts of mixed copper and nickel powders is next described. In these experiments, the compacts were heated for various lengths of time at different temperatures, and the degree of diffusion thereby produced measured by means of x-ray diffraction. A discussion of experimental errors is given.

Thermodynamics in Decarburization of Steel with Mill Scale

By W. A. Pennington, chief chemist and metallurgist, Carrier Corp.

Experiments have been conducted to show that the decarburization of ferrous alloys with mill scale is effected through two chemical reactions involving gases. One of these reactions causes an expansion in volume, at constant pressure, and therefore causes gases to escape from a heat treating chamber where decarburization is taking place.

A technique of following the effect of different variables on decarburizataion with mill scale has been established which is based upon volume measurements of the gases collected. The method is unique in that good results for the average specimen are available continuously throughout a run.

Among the factors investigated are: (a) Total pressure of CO and CO_2, (b) effect of inert gases, (c) type of scale, (d) composition of steel, (e) temperature, (f) thickness of steel, and (g) catalysts. Some suggestions have been made pertaining to decarburization in mill practice.

Cause and Cure of Inverse Chill and Hard Spots in Cast Iron

By C. A. Zapffe, and R. L. Phebus, consultants, Baltimore

Abnormal conditions of "inverse chill" in gray cast iron and zones of retarded graphitization—"hard spots"—in malleable iron are studied from the standpoint that both conditions

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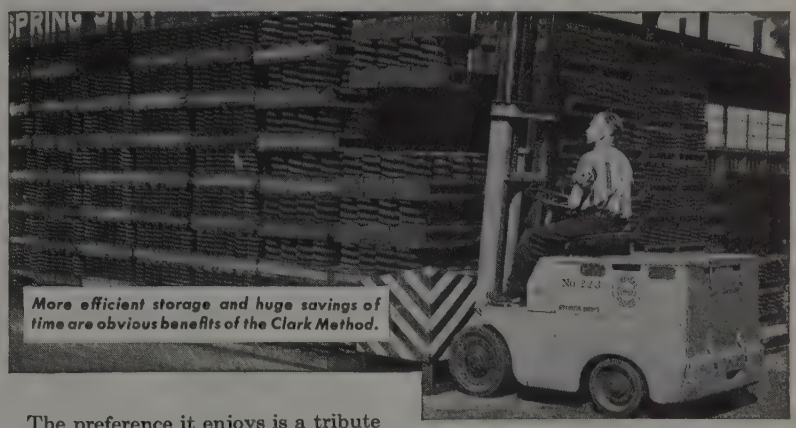

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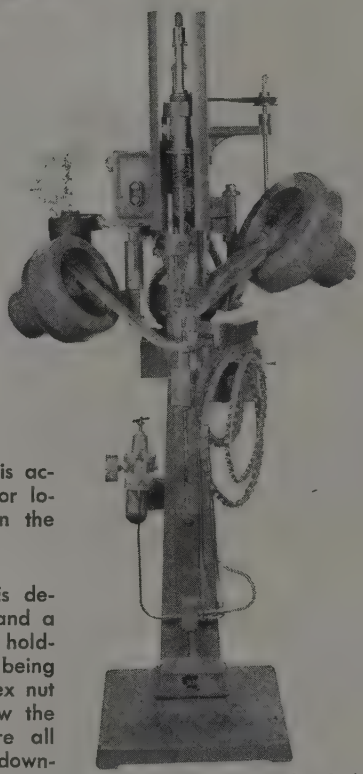

The fixture on the face of the column is actuated by an air cylinder. The operator locates the belt segments over a pin in the fixture.

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follow directly from hydrogen segregation similar to that causing "flakes" in forgings, "white spots" in castings, and "fisheyes" in welds.

Based upon the known stabilization of cementite by hydrogen, the study proceeds to disclose the thermodynamic nature of stabilization in general, and stabilization by hydrogen in particular, the relationship of hydrogen concentration across the area of segregation both to the cementite in the chill and to a secondary phenomenon of abnormal graphitization adjacent to the chill, and methods for prevention of the defects.

The Abrasion Resistance of Metals

By R. D. Haworth, Jr., supervisor, Abrasion Research, Armour Research Foundation

A new abrasion testing machine has been devised with which it is possible to determine quantitatively the resistance of metals to either dry or wet abrasion. Weight loss values obtained under several abrasive conditions are presented for a variety of metallic materials. The results show that, in the absence of impact, carbon content is the most effective alloying element in producing resistance to abrasion. With the same abrading material, dry abrasion usually is more severe than wet abrasion.

Ordinary methods of hardness determination show no reliable correlation with abrasion resistance. Hardness of the microconstituents relative to the abrading material together with the size, distribution, and quantity of the hard phases in the structure appear to be determining factors in abrasion resistance. Additionally, under dry abrasive conditions, hot hardness of the aggregate may be an additional important factor.

Versatile Vacuum-Fusion Apparatus

By Manley W. Mallett, research engineer, Battelle Memorial Institute

The vacuum-fusion method is a valuable metallurgical tool for the estimation of gases in metals. Details of the construction and operation of a vacuum-fusion apparatus are given. One unusual feature is that the gas sample is removed from the extraction apparatus by a fully automatic Toepler pump and analyzed in a modified Orsat apparatus. This versatile apparatus is used for gas analysis of plain carbon and certain alloy steels, nonferrous metals, alloys, and powders by vacuum fusions in graphite. In addition, analytical vacuum fusions in oxide (i.e., BeO) crucibles are made and small experimental alloy ingots are prepared.

Analytical difficulties arising from

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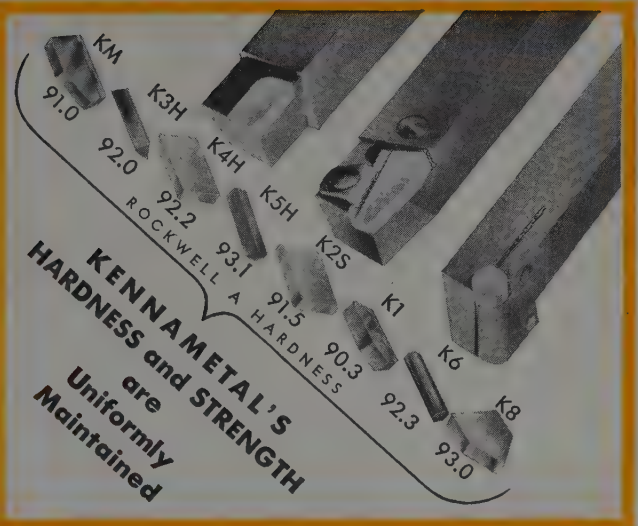

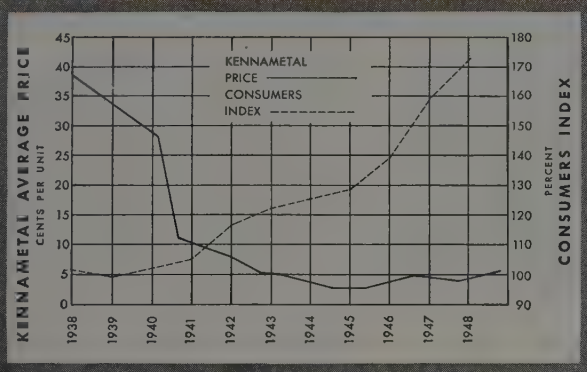

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* **Bill H. R. 5031** introduced into the House of Representatives, January 20, 1948, by Congressman Buffet of Nebraska cited as the "Gold Standard Act of 1948."

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the presence of large inclusions of Al_2O_3, glassy SiO_2, and refractory nitrides are discussed. Vapors of chromium and titanium tend to cause low nitrogen (and perhaps oxygen) analyses.

Residual Stresses and Microstructure in Hollow Cylinders

By H. B. Wishart, chief development metallurgist, and R. K. Potter, metallurgical inspector, Carnegie-Illinois Steel Corp.

Compressive stresses can be produced on the surface of hollow cylinders by quenching in a suitable medium from austentizing temperatures. Tensile or compressive stresses can be produced at the bore of the cylinder by quenching with plugged or open ends. The magnitude of the stresses is controlled within limits by the draw temperature.

The formation of an appreciable amount of martensite at the surface of the cylinders during water quenching materially lowered the surface compressive stresses when the cylinders were drawn, due to the volumetric change which occurs when martensite is tempered.

Formation of Sigma in a Wrought Heat Resisting Steel

By John J. Gilman, instructor in metallurgical engineering, Illinois Institute of Technology, Pun Kien Koh, research metallurgist, Allegheny Ludlum Steel Corp., and Otto Zmeskal, director, department of metallurgical engineering, Illinois Institute of Technology.

Formation of high temperature ferrite in a wrought heat resisting steel was studied metallographically. The structural stability at 1200 to 1600°F (650 to 870°C) was studied for the case of an initial structure high in ferrite (22 to 23 per cent) and for the case of an initial structure low in ferrite (2 to 3 per cent). It was found that the presence of ferrite markedly accelerated the formation of sigma. However, it was also found that cold work had an even more pronounced effect. Sigma was identified by x-ray diffraction and the pattern compared with those of other investigators.

Indium-Bismuth Phase Diagram

By E. A. Peretti, associate professor of metallurgy, and S. C. Carapella, Jr., teaching fellow, department of metallurgy, University of Notre Dame

The system, indium-bismuth, has been investigated using 65 alloys for thermal, x-ray, and metallographic methods of analysis. Thermal data are in substantial agreement with those obtained in a recent investigation by Henry and Badwick. The presence of a eutectic at 66.3 weight per cent indium and 72.1° C has been confirmed. A peritectic reaction, gamma liquid⇌beta, at 89.0° C has been detected, which is not in agreement

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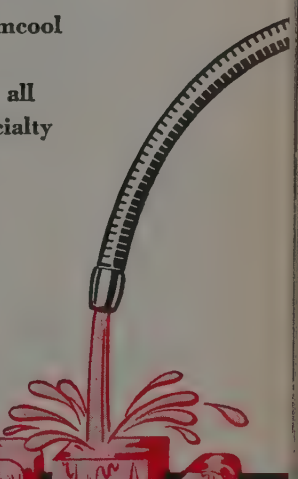

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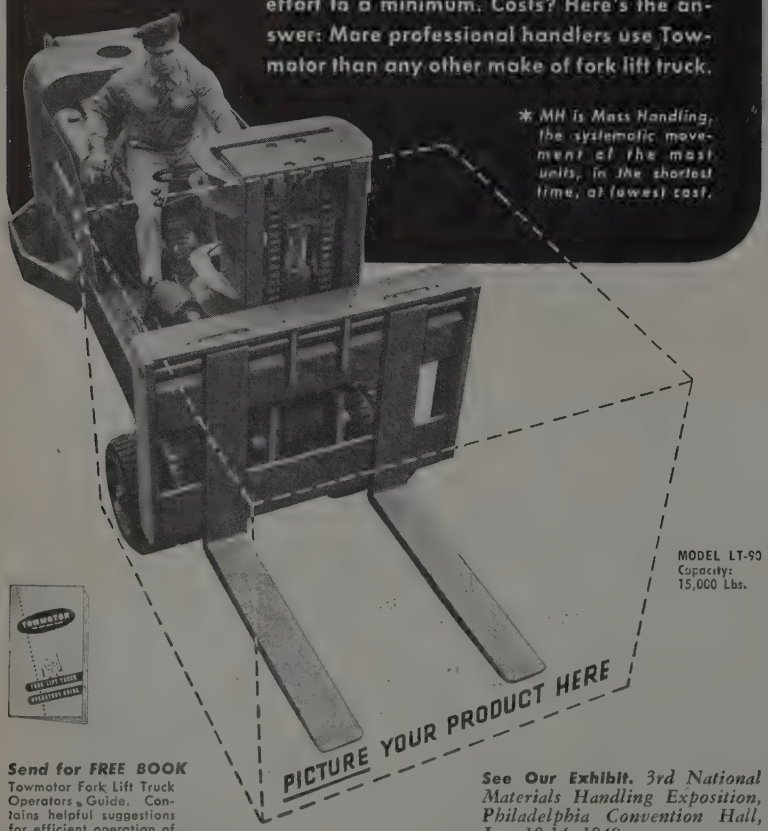

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with the eutectic proposed by Henry and Badwick in this region.

Between the gamma phase and pure bismuth, a eutectic was established at 33.0 weight per cent indium, which is in agreement with the revised diagram of these investigators. Four phases were found to exist at room temperature. For the first time, the complete course of the solidus and the limits of solid solubility of the indiumrich phase have been determined (20.5 weight per cent bismuth at 72.1°C and 7.1 weight per cent bismuth at room temperature). The solid solubility regions of the other phases are small.

Solder Flow Tester for Tinplate

By J. J. Sperotto, General Research Laboratories, American Can Co.

This paper presents a simple and rapid method for comparing the flow of soft solders on sheet metals and is particularly adapted to thin sheets such as tinplate. The method consists essentially of placing a constant volume pellet of solder on a tinplate disk together with an excess of flux and heating the disk above the melting point of the solder.

The extent to which the molten solder spreads out on the plate is measured with a planimeter and used for comparison. Incorporated in this method is a means for preventing distortion or buckling of the sample plate during the heating cycle and, also, provision is made for the introduction of an inert gas to reduce oxidation of the plate or solder.

Inclusions in Tensile Fractures of Forging Steels

By H. D. Shephard, metallurgical engineer, Kerchner, Marshall & Co., and E. A. Loria, fellow, Mellon Institute of Industrial Research

Procedures are described for studying flaws in steel by observing the surfaces of fractured tensile specimens under polarized light and by metallographic examination of the tensile test specimen at or near the fracture. Under consideration were specimens from two acid openhearth forging grades of carbon and carbon-vanadium steel. There were three types of fracture: (a) Those from steel dirtier than normal and having somewhat angular, fibrous fractures; (b) those from more ductile steel that broke with a silky, cup-cone fracture; and (c) flat, crystalline-appearing fractures in heavily forged steel.

Most of the fractures illustrated are not typical of the normal tensile fractures in these steels, but were selected to show the distribution of inclusions in steel that fractured with intermediate or low ductility.

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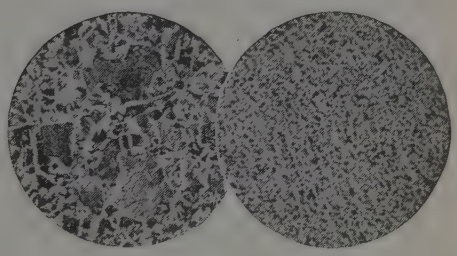

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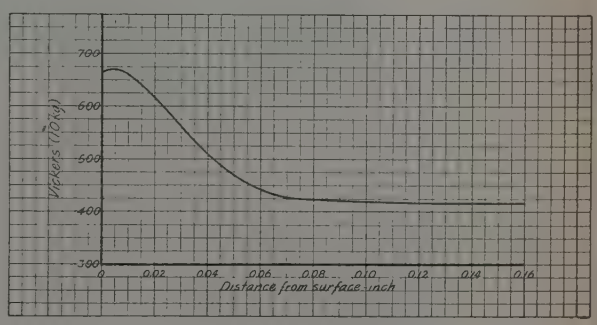

Hardness penetration graph of Chromium-Vanadium A 6120 steel, with a light case (0.80–0.85% carbon) in outer .010 inch

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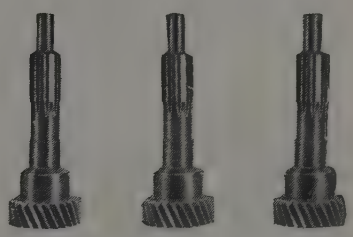

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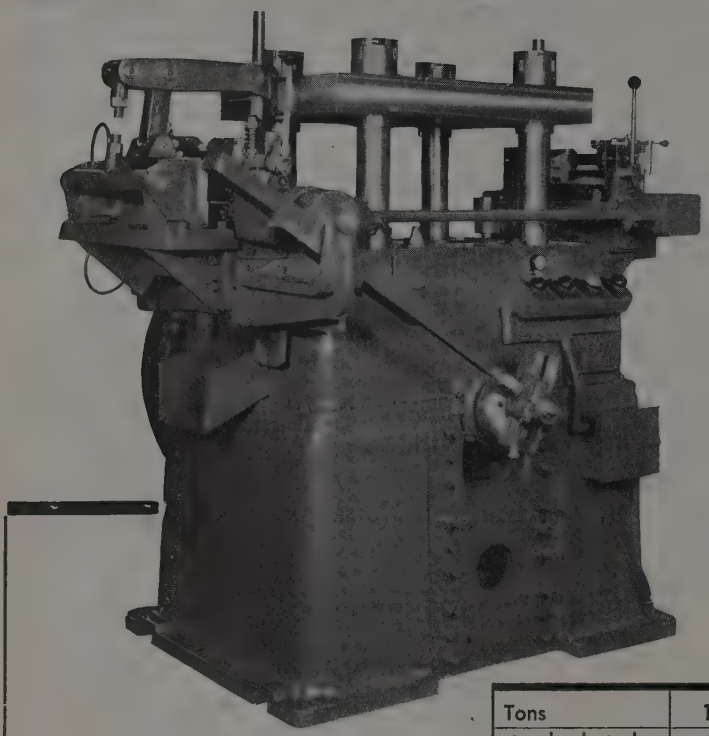

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AWS Technical Papers

(*Continued from Page* 147)

crease of transition temperature with decrease in initial energy, but the amount of decrease varied with the particular steel involved. Extrapolation to zero initial energy appears to give a direct correlation with transition temperatures for 72-inch wide plates.

Diesel Locomotive Maintenance Welding

By R. D. Rex, Air Reduction Sales Co.

Tardy application of the internal combustion engine as a prime mover for locomotives has given way to rapid and remarkable developments in this type of motive power, which is now becoming the dominant power source in the railroad industry. However, operational economies of diesel locomotives are offset by their higher initial cost and call for rigorous maintenance efficiencies to maintain the advantages of the diesel over other types of motive power.

Welding processes, especially new developments in arc welding techniques, are making a major contribution to the high standards of maintenance economy required by diesel locomotives. The rapidly increasing dominance of diesel equipment will still further emphasize the importance of welding applications.

Some of the more interesting welding applications in current diesel locomotive maintenance practice are outlined in this paper, such as as rebuilding diesel bodies, braze-welding repair of engine bases, and reclaiming of aluminum pistons, engine valves, cast iron cylinder heads.

Effect of Metal Composition on Weld Strength

By D. Rozet, H. C. Campbell, and R. D. Thomas Jr., Arcos Corp.

Optimum composition limits for carbon, silicon, manganese, sulphur and phosphorus have been established for 15 per cent Cr-35 per cent Ni weld metal, based on room temperature "505" tensile tests. Ultimate tensile strengths of 80,000 to 90,000 pounds per square inch and elongations of 30 to 40 per cent in 2 inches are obtained with weld metal of the following composition: Carbon 0.15 to 0.25 per cent, silicon 0.20 to 0.60 per cent, manganese 1.00 to 2.00 per cent, and sulphur and phosphorus each 0.25 per cent maximum. Tensile specimens are usually free from fissures, especially if the carbon is on the high side of the range. Satisfactory side bend specimens are obtained on welds within this range of composition.

Confirming previously published work, the introduction of columbium into the weld metal improves sound-

ness, but since it also decreases ductility, it is considered an undesirable addition. In certain applications requiring more than 1 per cent silicon, the carbon must be increased to more than 0.30 per cent to avoid hot cracking and fissures. Resulting weld metal has high strength and low ductility at room temperature, but compares favorably with the published properties of cast alloys of similar composition.

Submerged Melt Welding Applied to Railroad Cars

By C. R. Strutz, Oxweld Railroad Service Co.

Submerged melt welding has been used for some time in the fabrication of car tanks, car underframes, and side panels. Applications of the inert gas-shielded electric welding process have been widened considerably in the last two years. Its uses now include the fabrication of aluminum car tanks, stainless steel and Everdur condenser tanks for air-conditioning systems, and various furnishings. In fact, it is used on almost all of the hard-to-weld metals used on railroad cars.

In welded construction, perfection of the seal prevents leakage and corrosion at the welded joint. Welded design usually results in a saving in dead weight by eliminating extra metal required for lap joints, straps, braces, and rivets.

Use of Alloys and Welding in Oil and Gas Processing

By M. E. Holmberg, Phillips Petroleum Co.

Where metals are used under severe conditions, numerous problems and failures are encountered. By studying these failures, much can be learned, as a failure in service is in effect a test to destruction. This paper is based principally on the study of failures in welded alloy structures used in the oil industry. It is limited to processing equipment such as used in gasoline plants and refineries and deals mostly with piping.

Principal reason for using alloys in the applications referred to in this paper was because of the high temperatures encountered in service, and most of the problems and failures mentioned were associated with the high temperature services.

High Yield Strength Structural Steels

By A. Boodberg and Earl R. Parker, University of California

The paper describes the various tests that were conducted at the University of California on high yield strength structural steels. The work was a part of a large program, sponsored by the Navy, on the behavior of various steels used in ship construction. Primary objective of tests was to study the effect of variations of steel compositions on their transition temperature by means of tests of notched plates and welded structural assemblies.

Results of the tests show that the four high yield strength structural steels used in this investigation, when tested in the form of restrained welded specimens, have transition temperatures that vary from —65° F for one of the steels, to as high as +75° F for one of the others tested. The tests of notched specimens invariably showed transition temperatures for a particular steel that were approximately 50° F lower than those indicated by tests of the large specimens. However, it was found that the steels are rated in the proper order of their brittleness by all three of the tests.

Controlling Cutting Tip Clearance

By H. G. Hughey and R. B. Steele, Air Reduction Sales Co.

Mechanically-guided oxygen cutting on irregular surfaces has long presented difficulty due to the constantly changing clearance between tip and work. Mechanical devices, fre-

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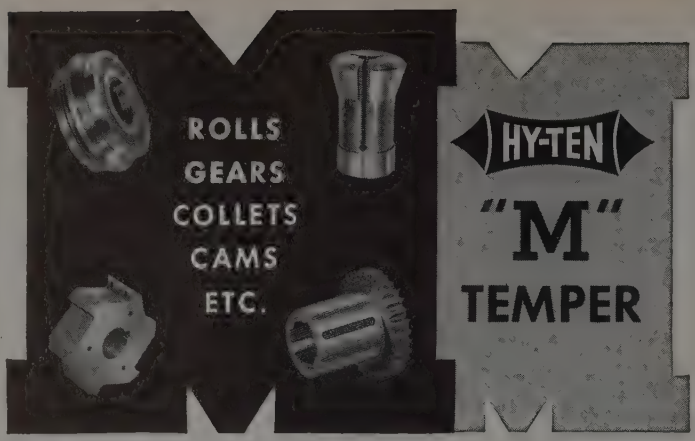

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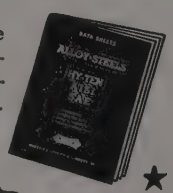

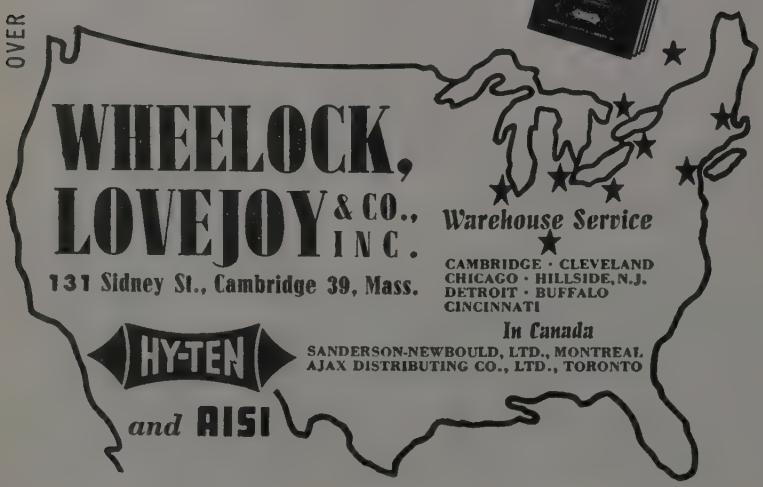

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quently devised, generally suffer from the deteriorating effects of heat and slag. A recent, nonmechanical approach makes use of flame characteristics to effect continual spacing. When a flame is impressed upon a surface, a rear view will disclose a central black spot. The dimension will vary with the degree of contact and may range in size from pin point to full orifice diameter. By impressing the image upon a light-sensitive electronic tube, and further, by establishing an electronic system which is sensitive to changes in size of the black spot, an electric motor can be controlled to cause the torch to rise or fall coincident with flame and work surface contact relationships.

Strain Aging in Welding Low Carbon Structural Steel

By W. H. Bruckner and W. E. Ellis, University of Illinois

Tests were made of ½-inch thick rolled plates of ASTM A7 steel welded with E 6010 electrode. Strain aging tests were made with taper drawn, work brittleness bars of plate and weld deposit drawn through a strain gradient of 0 to 10 per cent. Hardness tests were made to follow changes in hardness with time and temperature for definite strain levels. Charpy V-notch impact tests were made over a temperature range to determine notch sensitivity and transition temperatures of base plate and weld deposit in original condition, strain aged and in thermally stress relieved condition.

Base plate, deoxidized with silicon, was of good quality. The weld deposit was laid down in such a manner as to fully recrystallize all previously deposited weld metal. Susceptibility to age after straining is therefore found to be of a low order under conditions of the tests performed.

Powder Cutting and Scarfing in the Steel Industry

By Frank A. Snyder, Carnegie-Illinois Steel Corp.

Iron-rich powder introduced into the preheat and cutting flames of a cutting or a scarfing torch causes chemical reactions that result in the liberation of intense heat. Heat from the combustion of the introduced powder breaks down protective films such as chromium oxide in stainless steels, graphite flakes in cast iron, heavy iron oxide on carbon steels, etc., and allows the oxygen stream of the oxy-acetylene torch to attack the base metal continuously.

Development of the equipment necessary to put the process into practical operations is described briefly. The paper brings out the usefulness of the process, in describing the spread of its use to blast fur-

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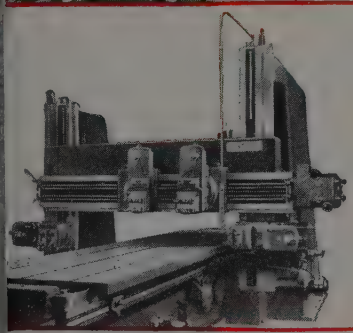

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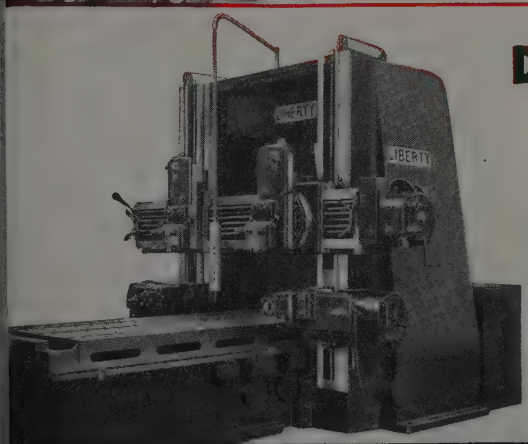

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naces, iron foundry, steel production, scrap preparation, and the maintenance divisions of a large steel plant. Descriptions and illustrations of typical applications are supplied.

Composition and Performance of Welded Plates

By J. Heuschkel, Westinghouse Electric Corp.

For welded T-joint bend specimens prepared and tested under identical conditions with steels from ½-inch thick plates involving 73 commercial heats it is shown that total analysis is the basic variable influencing postwelded deformation limits of the specimens at both normal and sub-zero temperatures. Rolling conditions, prewelded strengths and maximum postwelding hardness are pertinent factors which further influence the results for any one analysis.

Individual influence of each of the various common alloying elements upon the ability of the joint to deform under concentrated stresses, at both normal and sub-zero temperatures, is evaluated relative to that of carbon at normal temperature. A relation between total analysis and performance under these conditions is presented. For each family composition, optimum prewelded normal temperature strengths and maximum postwelded hardness ranges exist and the limits of these ranges are indicated for nine composition types.

Evaluating Welding Arc Stability

By R. A. Wyant, L. P. Winsor and L. M. Schetky, Rensselaer Polytechnic Institute

Welding laboratory at Rensselaer Polytechnic Institute has for some time been engaged in an investigation of welding arc stability sponsored by the Bureau of Ships of the Navy Department. Primary objectives are the development of instrumentation for quantitatively evaluating the stability of the welding arc and the application of such instrumentation to a study of some actual welding arcs. Work is based on the assumption that stability of the welding arc can be evaluated in terms of fluctuations in arc current and voltage, and occurrence of short circuits.

This paper deals with the application of the circuits to a study of welding arcs established with mold steel electrodes of several types and under a variety of conditions with respect to arc current and voltage. There seems to be a distinctive relationship between root-mean-square deviations in arc current and voltage, and the average values of arc current and voltage. Likewise, there is a distinct relation between occurrence of short circuits and the average values of arc current and voltage.

Spot Weld Shunting in 24 ST Alclad

By A. R. Hard, State College of Washington

This paper describes the results of tests in which an attempt is made to compensate for spot weld shunting in single row joints by using increased welding energy levels. These results are compared with standard panels welded at various spacings and constant energy level. A method of measuring shunt path resistance through a spot weld was developed by using a modification of the standard surface resistance determination. Results of these tests were used in determining the energy levels necessary to compensate for shunting at various spacings.

Specialized Steel Mill Cutting Machines and Controls

By R. F. Helmkamp and A. H. Yoch, Air Reduction Sales Co.

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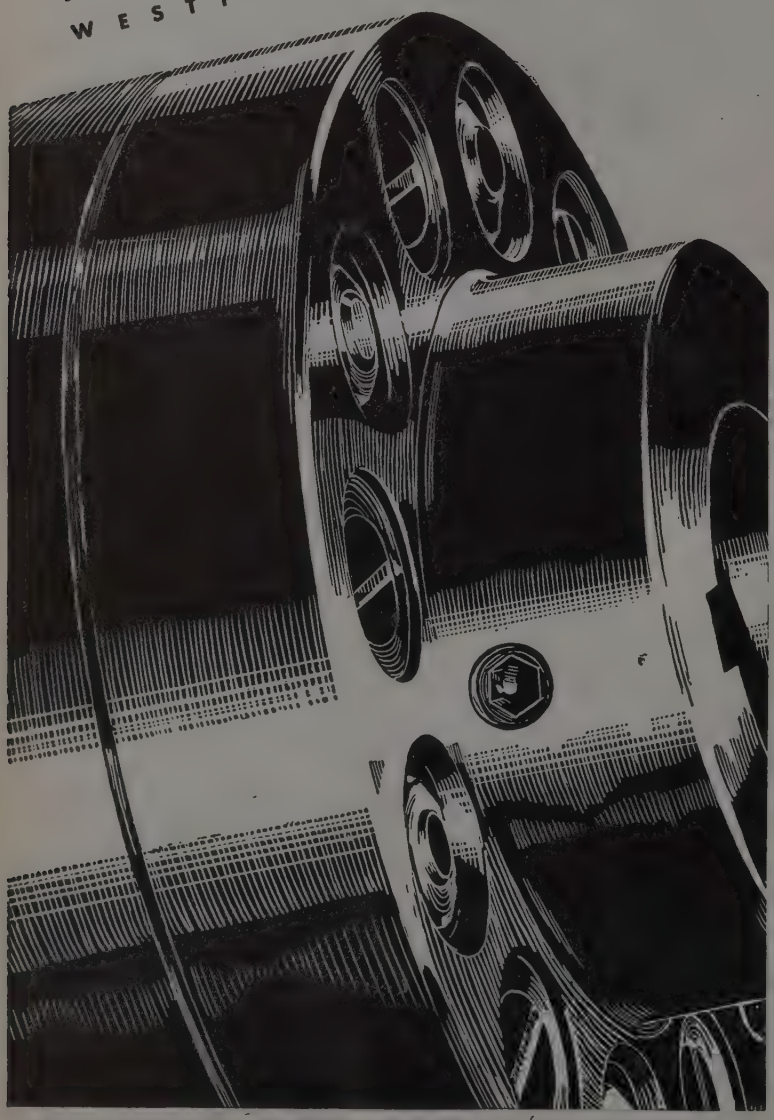

made this possible. Electronics have played a part in this progress and we find them employed as motor speed controls, template tracers and arrangements to maintain cutting tips at a constant height from the work piece.

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Resistance Welding Characteristics of Dry Disk Rectifier Welder

By R. H. Blair and C. E. Smith, Taylor-Winfield Corp.

New method of resistance welding when using direct current in the secondary of the welding machine is described in this paper. The paper consists of a general discussion on the electrical operation and electrical characteristics of the dry disk rectifier welder showing its method of obtaining direct current for welding and the wave shapes obtained by this method.

Secondary wave shapes are rather new and novel in comparison to present 60-cycle frequency welding machines in that the rate of rise of current is much slower, producing some very interesting results in the welding of certain materials.

In the past, units of this type were generally given consideration only for power factor correction or lowering the kilovolt-ampere demand of the welding machine, and it appears that the secondary wave shape will offer considerable improvement and very interesting results.

Corrosion Resistance of Powder-Cut Stainless

By C. R. Bishop and L. E. Stark, Union Carbide and Carbon Res. Labs. Inc.

With widespread application of the powder-cutting process for cutting stainless steels, particularly in the chemical equipment field, interest has been expressed regarding effects of the process on the corrosion-resistance of the steels, and whether the effects can be corrected by suitable annealing or modifications of the cutting procedure.

This paper discusses the condition of kerf and heat-affected zones of powder-cut edges in stainless steels, the welding of the powder-cut beveled edges, and the minimizing of heat effects by means of water-quenching applied simultaneously with the cutting operation. Zone adjacent to the cut face which is chemically altered by powder-cutting process is not more than 0.03-inch thick and this zone can be removed by

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superficial grinding. Preparation of beveled plate of unstabilized stainless steels by powder-cutting does not increase the severity of the heat-affected zone when subsequently welded by manual arc or submerged melt methods.

Effect of D-C Component In A-C Inert Gas Welding

By Glenn J. Gibson and Gilbert Rothschild, Air Reduction Sales Co.

Detrimental effect of the direct current component in alternating current inert gas arc welding on saturating the primary of welding transforms and causing very poor power factors has been generally recognized. This effect can be corrected by two different methods. One bypasses the component from the transformer but leaves it in the arc; the other takes it out of both the arc and the transformer. Purpose of this paper is to show what effect the direct current component has on the welding characteristics of the arc and thus determine whether it should be maintained in the arc or removed. Results showed that better welding conditions exist when there is no direct current component in the welding arc.

Inert-Gas Shielded Arc Welding and Control Equipment

By N. E. Anderson, Air Reduction Sales Co.

Equipment falls into three general classifications; namely, (1) manual, (2) machine or semiautomatic, and (3) fully automatic. In addition to these categories, additional equipment may be necessary for use with certain metals, specifically aluminum and magnesium. While completely automatic machines are most intricate from the design and operation standpoint, certain fundamental design concepts apply to all three classifications. This paper covers general and specific design objectives to accomplish good welding under all known conditions and applications.

A section of the paper is devoted to explaining what specific equipment constitutes a complete system for various types of welding. In addition, mention is made of what is being done to accomplish compliance with the new Federal Communications ruling on high frequency oscillators for arc stabilization.

Heliarc Welding Pure Copper for Pressure Vessels

By John W. Mortimer, Whitlock Manufacturing Co.

This paper is presented to attempt to explain through a related series of experiments, carried out under shop conditions, that copper can be successfully welded to copper acceptable to the ASME code and meeting the requirements of industry. The need and economy of copper welding and the future of this type of work is also covered in the report.

Welded Continuous Frames and Their Components

By W. William Luxion and Bruce G. Johnston, Lehigh University

This is the first progress report on an extensive program in which it is planned to test beams, connections, columns, and frames. Emphasis will be on the development of fully-continuous welded construction with special attention to the behavior beyond the elastic range. Ultimate purpose is to provide design information to take advantage of the full strength inherent in fully-continuous welded building and bridge construction.

This initial report deals only with wide flange sections tested as simple beams with the purpose of studying their basic behavior at initial yielding and in the plastic range. A study is made of different weight sections in both the stress-relief annealed and as-delivered condition. Strain distribution throughout the members at

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   22.6 tons at 400 psi—32"/min.
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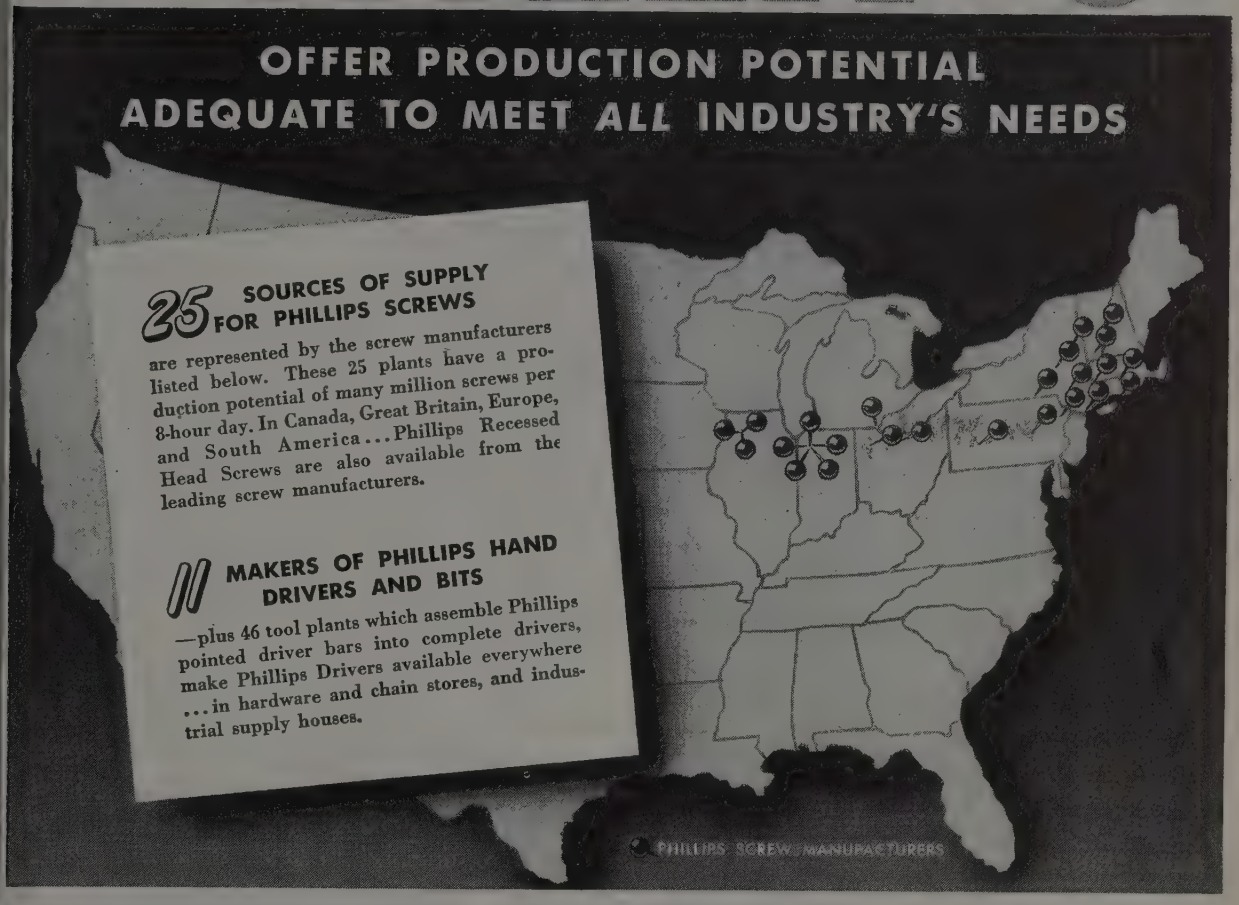
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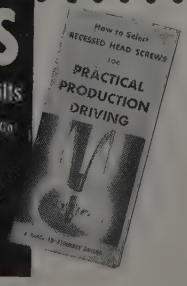

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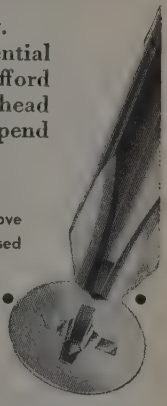

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various stages of yielding is shown. Comparison between the overall experimental behavior and the theoretically predicted behavior of the specimens is also reported.

Spotwelding Schedules for Nickel and Nickel Alloys

By Frank G. Harkins, Solar Aircraft Co.

Experiments in welding nickel and nickel alloy foils of 0.002-inch thickness are described. Particular attention is given material preparation and chemical cleaning procedures. Schedules for welding dissimilar metal thicknesses such as 0.002 to 0.040-inch are developed. Various methods of achieving "heat balance" to insure proper nugget location are pointed out. Importance of electrode size and composition, pressure time, current and mechanical considerations are investigated. Tentative schedules for adoption by Resistance Welding Committee are submitted.

Production Heliwelding Stainless Steel

By Newton A. Blickman, S. Blickman Inc.

This paper deals primarily with some of the practical aspects and applications of inert gas welding of stainless steel, showing various examples and setups used for welding by this process. The pros and cons of manual, semiautomatic and full automatic will be discussed in relation to each application. Use of carbon and tungsten electrodes will be discussed and evaluated.

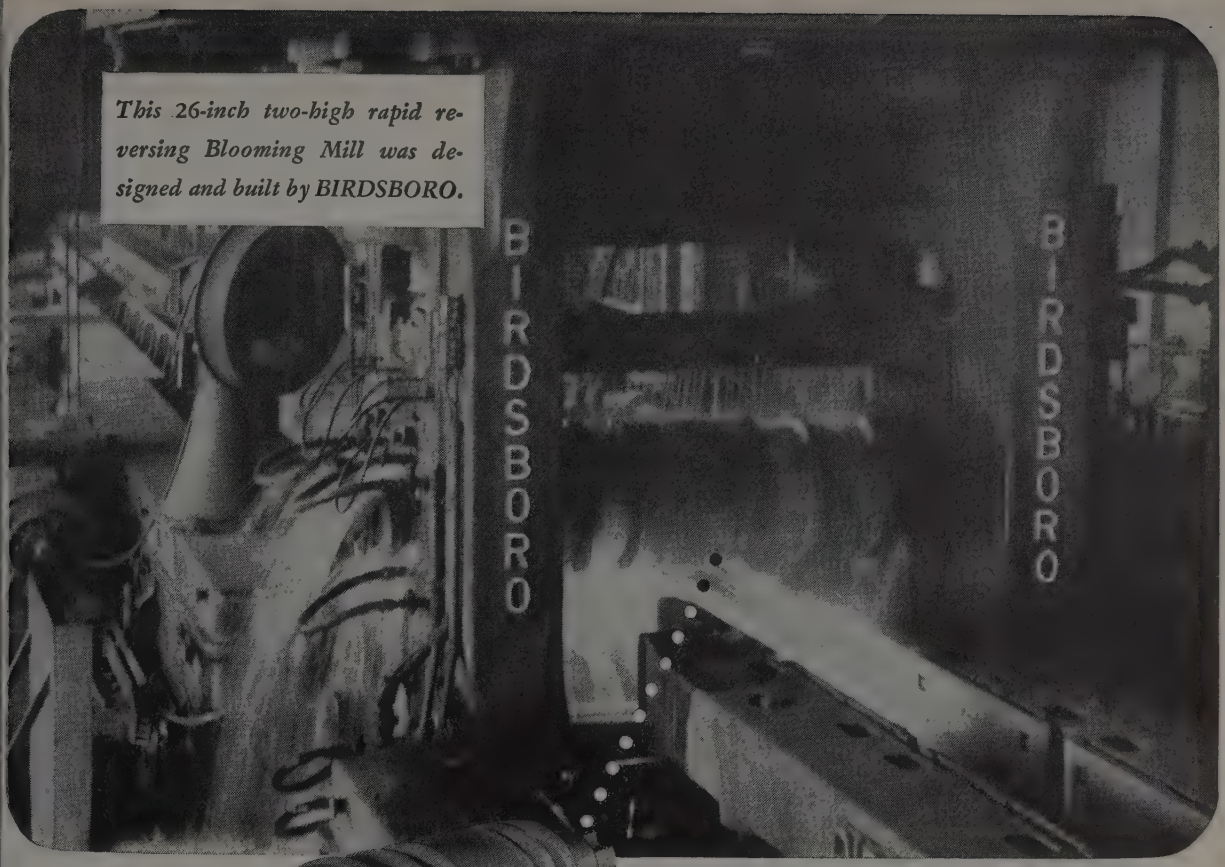
Several jigging techniques are mentioned and shown. Special attention is given to the dangers of improper fixtures and poor fit-up. Examples are shown of the use of filler rod and the methods of applying filler.

Inert Gas Shielded Spot Welding

By F. J. Pilia, The Linde Air Products Co.

The author describes the operation and development of a new spot-welding process, combining some of the features of resistance spot welds and metal arc plug welding. The welds, however, are made from only one side of the sheet.

Inert gas shielded spot welding is used to its greatest advantage where the work is obstructed and both sides of the weld cannot be reached, or where the size and shape of the workpiece require resistance welding guns or machines with excessive throat depth. Installation cost is low so that inert gas shielded spot welding may be employed where economics of such factors as size of production would not justify investment in the more expensive resistance spot welder. It is also of advantage in



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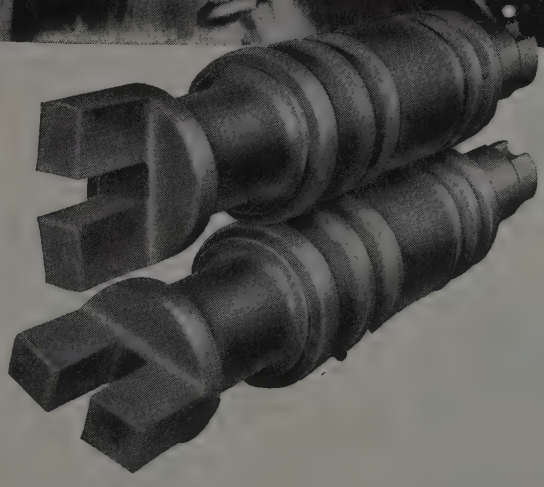

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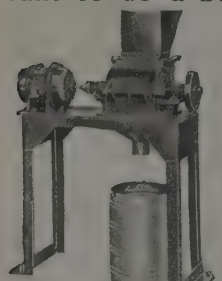

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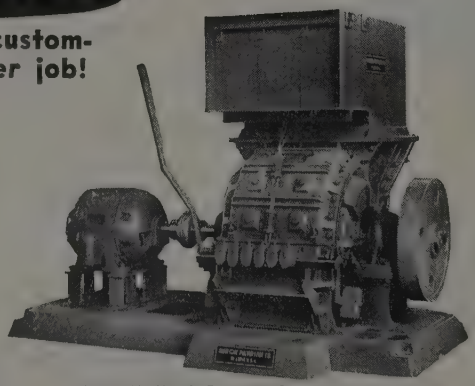

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that the manual skill of metal arc or gas weld tacking can be replaced on light sections in production by non-skilled operators. This process does not replace resistance spot welding on a cost per spot or time basis when conditions are favorable to resistance spot welding.

Welding in Steel Mill Maintenance

By L. P. Elly, Bethlehem Steel Co.

Over a period of years the welding and cutting arts have become familiar tools of the everyday maintenance operation. In a large plant the advantages of a central maintenance welding and machine shop have long been proven. In smaller plants where a central shop presents too much overhead expense, its advantages can still be realized through a well equipped commercial welding shop.

Direct operating labor today makes up over 90 per cent of the cost of the average maintenance welding job. Therefore, it is obvious that the most appreciable reduction in maintenance welding costs can be obtained by mechanization of welding operations wherever possible. The repair of damaged or broken mechanical equipment comprises a large part of the maintenance welding job. In many maintenance welding jobs the cost of reclamation is prohibitive and it is found that the fabrication of replacement parts by welding is more economical.

Economies of Hard Facing

By J. J. Barry and Albert Muller, Air Reduction Sales Co.

Hard-facing is used primarily to increase the service life of parts subject to abrasion, impact, heat corrosion or any combination of these wear factors. Several economies are apparent with increased service life.

Knowing the actual service conditions of a part and the physical properties of the various hard-facing alloys, an alloy can be selected which will be best suited for the applications. This paper covers actual case histories of construction, steel mill, agricultural, railroad and petroleum equipment proving that savings result from the use of hard-facing.

Flame Hardening Methods and Techniques

By J. R. Burg, Baldwin Locomotive Works

This paper indicates what types of locomotive equipment lend themselves to flame hardening and why flame hardening is chosen as a method of obtaining a hardened surface rather than some other mode of surface hardening. It also describes the processes and equipment used in Baldwin

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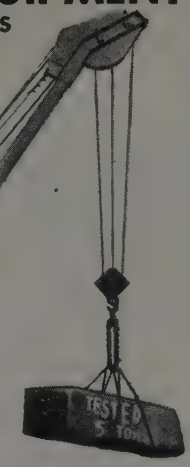

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All-Welded Fabrication of Shipping Containers

By G. J. Green and D. H. Marlin, Dravo Corp.

The authors cover the methods and fabricating procedures incorporated in manufacturing all-welded commercial shipping containers. Desire for a new product and the need for a safe, economical shipping container prompted the study and design of such a container.

This unit is designed to have a cubic content of 277 cubic feet with a carrying capacity of 12,000 pounds. A combination of resistance and metallic arc welding is used in the preassembly and erection of 14 and 16 gage corrugated bottom and roof sections, 18 gage corrugated side panels and 10 gage corner posts. Total weight is 1850 pounds.

Present design, with the use of hot rolled and cold rolled steel sheets, is described in detail first as to jigging and fixtures for prefabrications; next, the resistance welding of top, bottom and side assemblies and the manual welding of assembled containers.

Structural I-Beam Cut-Off Machine

By George J. Strate, Air Reduction Sales Co.

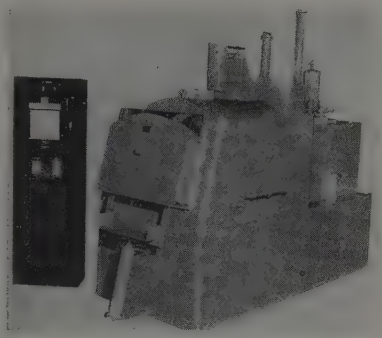
This paper describes an oxyacetylene cutting machine which crops ends and cuts 10 to 36-inch structural I-beams to length on a steel mill roll table. Mechanical construction of the machine is described in detail including the procdure for adjusting the various components of the unit to cut various sizes of I-beams. Method of installation in a steel mill roll line is also indicated.

Features of the controls for operation of the machine are discussed. These include positioning of the cutting tips for start of a cut, control of cutting speed of the flange torches including automatic slow down through the web section, control of cutting speed of the web torch, and control and ignition of gases for the cutting tips.

New Products and Equipment

Heat Treating Unit

Series T heat treating units, made by Ipsen Industries, Blackhawk Bldg., Rockford, Ill., consist of a batch loading automatic furnace connected and sealed to an automatic quenching tank. Units may be gas or electric fired, are convertible to the other



later if desired, and may be installed in single or multiple units.

Operator starts cycle by placing a tray of parts in the furnace and setting the timers, one for the heating cycle and the other for quenching or cooling time. He sets selector switch for oil quenching or air cooling as desired. When preset heating cycle is completed, the intermediate door momentarily lifts to allow tray to automatically pass into the cooling chamber and be oil quenched if so selected. Lights indicate furnace is ready for another load when tray passes into quenching chamber and when work is ready for removal.

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Foundry Ladle Truck

A rotor-ladle attachment for foundry fork trucks has a capacity of 4150 pounds of molten metal, according to Yale & Towne Mfg. Co., Philadelphia 24, Pa., its manufacturer.

The 6000 pound capacity truck and ladle was designed to pour molten metal without having to remove the ladle from the truck. The truck has a 360 degree rotor with two speeds, the slower speed giving added control when actually pouring.

In operation the ladle is picked up by means of forks, lifted to desired pouring height and rotated to pour as desired. The truck used is an end control fork model of 54-inch wheelbase, 83-inch mast height and 45-inch width. The ladle measures 34½ inches in diameter and 39 inches high.

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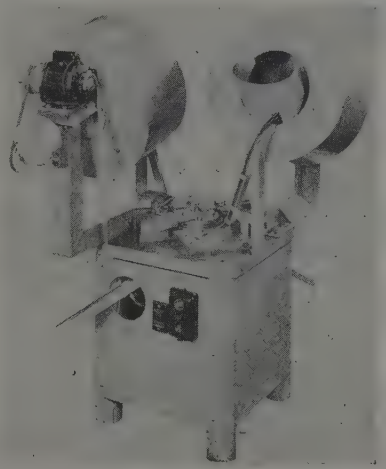
Thread Roller

Bolts and studs of various descriptions up to ¼-inch in diameter can be threaded, ribbed, knurled, marked, necked, etc., by the rotary thread rolling machine, the Rollmaster, de-



veloped by D. H. Prutton Machinery & Tool Co., 5295 West 130th St., Cleveland, O. Any of the above operations may be performed at the rate of between 15,000 and 20,000 pieces per hour. The small, sturdy machine has no motion lost by reciprocating movements.

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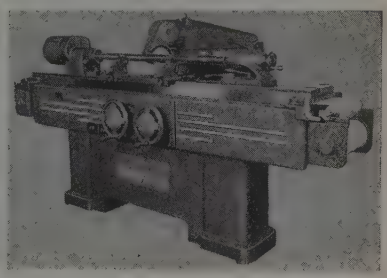
Broach Sharpeners

Two machines for sharpening flat broaches, three for sharpening round broaches and two which will handle both flat and round broaches comprise the line of seven broach sharpeners announced by Colonial Broach Co., Box 37, Harper Station, Detroit 13, Mich. The flat broach sharpening machines will broach up to 8 inches wide and up to 32 and 65 inches long at one setting, respectively. The round broach sharpeners will handle tools up to 6 inches in diameter and up to 36, 72 and 84 inches long, respectively.

Universal models will take round broaches with diameters up to 6 inches and up to 72 and 84 inches long, respectively, and flat broaches up to 8 inches wide and 65 and 77 inches long, respectively. All grinding wheels and headstocks on all machines are equipped with built-in motors. Spindles of all machines have a standard speed of 4000 revolutions per minute which can be increased to



10,000 by special pulleys. Headstocks for round and universal machines have two-speed gearing for spindle speeds of 200 and 400 revolutions per minute.

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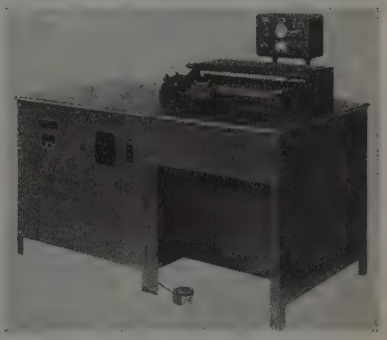
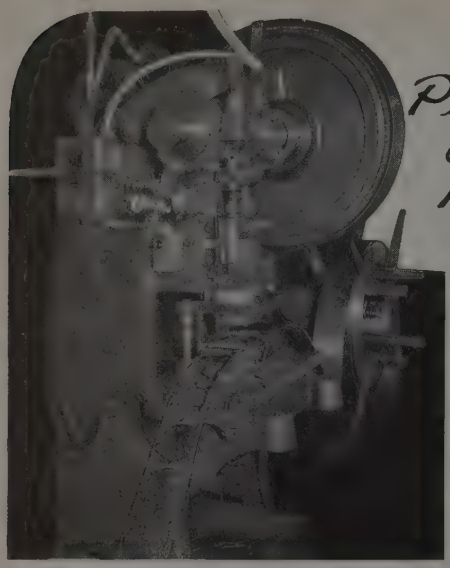
Inspection Process

A method whereby parts may be magnetized in several directions at the same time has been developed for use in Duovec inspection units made by Magnaflux Corp., 5900 Northwest Highway, Chicago, Ill. It per-



mits parts to be inspected for defects in any direction with one magnetizing operation and one visual inspection operation. Two magnetizing forces are applied simultaneously by placing parts between the heads of the unit while the inspection bath is being applied.

Current is passed through the part as in normal circular magnetization and at the same time is subjected to a longitudinal field of regularly changing strength. Swing of the field may be adjusted from 0 to 90 degrees swing. This type of magnetization is used with the fluorescent Magnaglo particles as well as the usual Magna-



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SUCCESSORS TO LOSHBOUGH-JORDAN TOOL & MACHINE CO.

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McDANEL

HIGH TEMPERATURE PORCELAIN COMBUSTION TUBES

All McDanel Tubes are thoroughly tested before they are permitted to leave our plant.

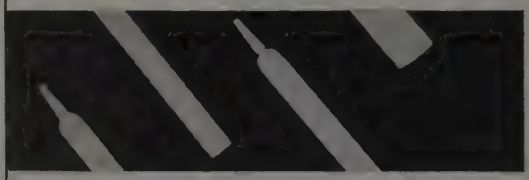
McDanel thoroughness starts with the mixing of the batch and continues through every stage of production. Density, bore size, wall thickness, etc. must be 100% right. Add to this exactness of production routine, low coefficient of expansion and maximum resistance to thermal shock and you have the answer to why McDanel Tubes are so generally preferred by leading metal lurgical laboratories throughout the country.

Made with straight, tapered and double reduced self-cooling ends.

OTHER McDANEL PRODUCTS

- Self-cooling Combustion Tubes.
- High Temperature Combustion Tubes.
- Refractory Porcelain Specialties in stock or designed to meet specific needs.

Specify McDanel High Temperature Combustion Tubes from your supplier.



McDanel Refractory Porcelain Co.
Beaver Falls . . . Penna.

flux visible particles in obtaining indications of defects.

Check No. 5 on Reply Card for more Details

Parts Washer

Complete fire protection in the use of flammable cleansing solvents is provided by the Air-Matic automatic parts washer, developed by Protectoseal Co., 1920 South Western Ave., Chicago 8, Ill. Compact and portable, the machine can be set up alongside production machines. Washing of parts is by moving a perforated basket up and down through the solvent. Machine is built to produce the least possible turbulence.

Lack of turbulence is also a safety factor in that fewer explosive vapors are created from the flammable solvent used. A reciprocating air engine supplies the power necessary to operate the machine. In the event contents of the washer should become ignited, the cover is designed to automatically close and snuff out the fire.

Check No. 6 on Reply Card for more Details

Drilling Machine

With a 22-foot height and over 14 foot maximum clearance from floor to spindle, the 12 foot master Super Service radial drilling machine, built by Cincinnati Bickford Tool Co., Cincinnati 9, O., can perform drilling operation on such huge parts as engine frames, turbine casings, machine parts, etc. It has a range of spindle speeds from 12 to 1200 revolutions per minute and permits drilling or boring of holes from ¼ to 16 inches in diameter.

Machine has a constant speed drive with all controls centralized at the head. Operation may be on alternating or direct current. The head

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THE NEW STANDARD
Those who use preformed wire rope do so because of its exceptional performance. Those who don't use it, should use it if only to make a comparison.
Those who use it know that
● it lasts longer
● is easier to install
● is safer to use
● and costs less to use

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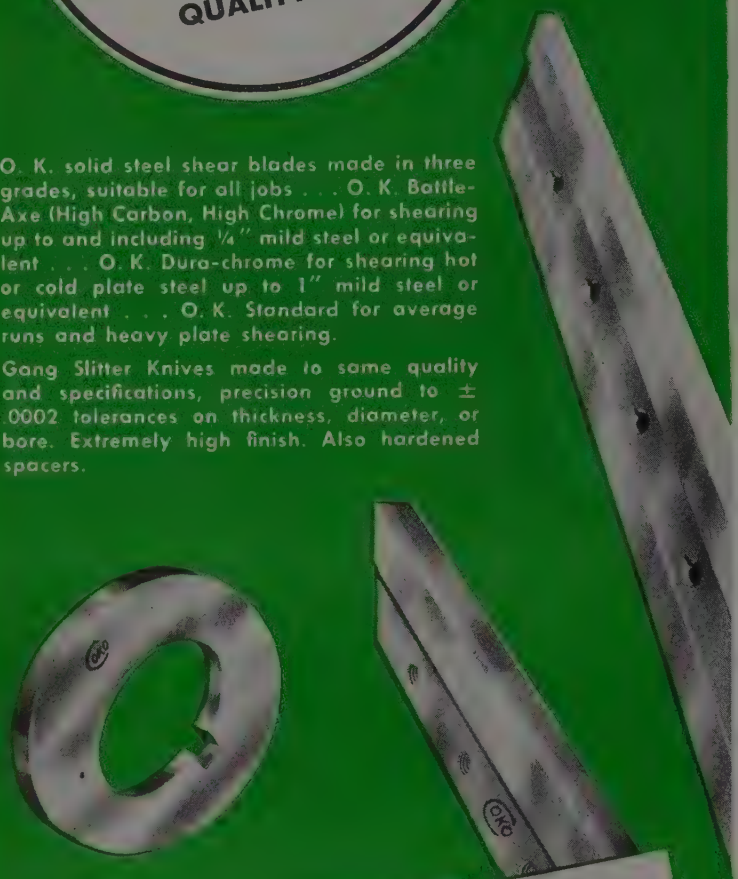
SHEAR BLADES
are unequalled for
CLOSE TOLERANCE
UNIFORM HARDNESS
QUALITY STEEL

O. K. solid steel shear blades made in three grades, suitable for all jobs . . . O. K. Battle-Axe (High Carbon, High Chrome) for shearing up to and including ¼" mild steel or equivalent . . . O. K. Dura-chrome for shearing hot or cold plate steel up to 1" mild steel or equivalent . . . O. K. Standard for average runs and heavy plate shearing.

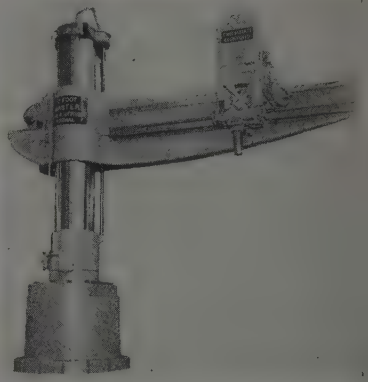
Gang Slitter Knives made to same quality and specifications, precision ground to ± .0002 tolerances on thickness, diameter, or bore. Extremely high finish. Also hardened spacers.



THE OHIO KNIFE CO.
CINCINNATI 23, OHIO
Gentlemen: Please send me without obligation your new catalog with specific data on Slitter Knives, Spacers, Straight Blades.
COMPANY
NAME
ADDRESS

The OHIO KNIFE Co.
CINCINNATI, OHIO, U.S.A.

moved toward the column at its closest position and locked in place permits a crane to move the machine without seriously upsetting its equi-



librium. A bailing hook on the cap of the machine assists in the portability.

Check No. 7 on Reply Card for more Details

Pumping Service Motor

Three-phase squirrel cage Life-Line induction motors of weatherproof construction are available from Westinghouse Electric Corp., P. O. Box 868, Pittsburgh 30, Pa., for outdoor pumping service. Offered in rating of 1/2 to 15 horsepower (frames 224 through 326), the motors have all steel construction, resulting in a lighter and more compact motor.

The type CSP motors have self-sealed, prelubricated ball bearings for 5 year or longer lubrication. Tuffernell insulation with Tufvar wire provides maximum dielectric strength with high flexibility. Motors are available for 60 cycle, 3-phase, 220-440 volts, 900-1800 revolutions per minute, 40° C rise for continuous duty NEMA designs B and C and 50° C rise continuous duty open NEMA design D (5-8 per cent slip), normal torque, normal slip; high torque, normal slip; high torque, 5 to 8 per cent slip.

Check No. 8 on Reply Card for more Details

Multiple Drill Head

Multiple adjustable drill heads, in a new heavy duty series, are being offered by Strutz & Mead Inc., Milwaukee, Wis., representatives for Wisconsin Drill ,Head Co., manufacturers of the Kwick-Change drill heads. The series is made in two to eight spindle models, the bolt circles varying from 2 3/16 to 14 63/64 inches in two spindle model, to 7 31/64 to 20 17/64-inches in the eight spindle head. Holes up to 1¼-inches may be drilled in cast iron.

Heads are equipped with No. 3

LIKE FAMOUS WASHING-MACHINE MAKERS YOU, TOO CAN

Mangle Costs
Stop Profit-Shrinkage
Starch up Sales

with AMERICAN PHILLIPS SCREWS

LOSSES WASHED UP! Coin-slot washer-manufacturers can't afford to use slotted screws. For, as one maker says: "Slotted-driver gouges would cost us 50c to $5.00 to refinish a painted panel." American Phillips Screws stop all that. And they start new savings — *of several seconds per screw* — that add up as high as 50%.

SALES STARCHED UP! Unburred American Phillips Screwheads mean that coin-laundry customers can't snag the clothes they put into machines. And these stay-tight screws mean, too, that washers are less often down for repair. Find out what double-edged production and sales-spurs American Phillips Screws can apply to *your* product. Write.

4-WINGED DRIVER CAN'T SLIP OUT OF PHILLIPS TAPERED RECESS

AMERICAN SCREW COMPANY, PROVIDENCE 1, RHODE ISLAND

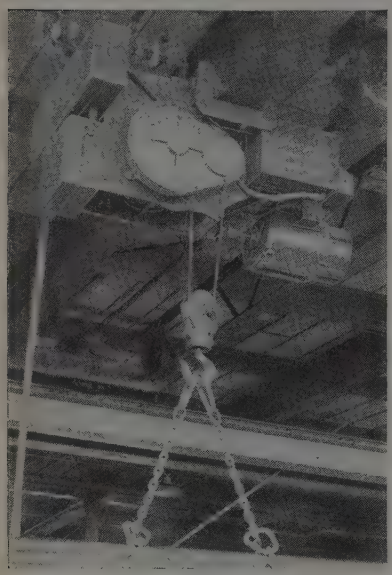
Chicago 11: 589 E. Illinois St. *Detroit 2:* 502 Stephenson Building

AMERICAN PHILLIPS *Screws*

ALL TYPES
ALL METALS: Steel, Brass, Bronze, Stainless Steel, Aluminum, Monel, Everdur (silicon bronze)

for *more* output

UNTIE YOUR WORKERS' HANDS!



Six men were moving these steel bars from flat cars to stockpile, and thence to cutting saws and shipping carriers. To speed handling, a *Reading* Engineer was called in. A *Reading Electric Hoist,* right angle mounted, plain trolley, on a single I-Beam motor driven crane was recommended and installed. Now the job is handled by only three men . . . bars move faster . . . *and the three "extra" men have been switched to other productive jobs!*

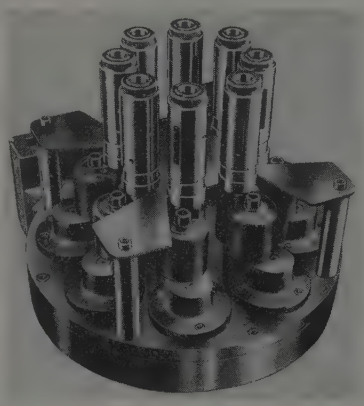
For an analysis of your handling operations, at no obligation, contact *Reading,* today. Write for "The Why and How of Faster Production".

READING CHAIN & BLOCK CORPORATION
2102 ADAMS ST., READING, PA.

CHAIN HOISTS • ELECTRIC HOISTS
OVERHEAD TRAVELING CRANES

READING HOISTS

Morse taper spindles having a 1 inch vertical drill adjustment. Drill heads are of antifriction bearing construction throughout and all gears are of SAE 4615, carburized and



hardened. One set of positioning templates is furnished with the head. Each spindle rotates around two centers, making possible an infinite variety of hole patterns and bolt circles.

Check No. 9 on Reply Card for more Details

Broaching Press

The G6 - S - W - C self - contained broaching and guided assembly press, built by Greenerd Arbor Press Co., Nashua, N. H., was designed with a minimum of deflection for broaching and assembly requiring accurate alignment. Used for wet or dry broaching, assembly and die work, the machine has a ram speed (down) adjustable from 20 to 300 inches per minute, with a return speed of 460 inches per minute.

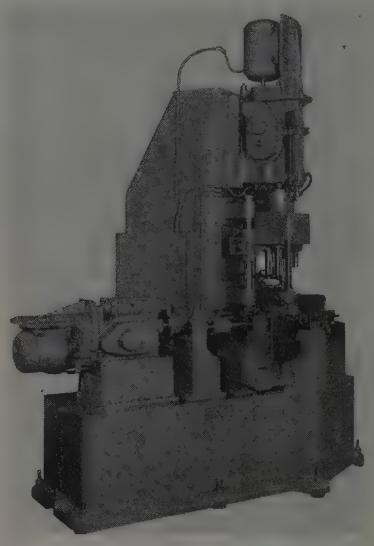
Press may be furnished with dual ram control as a safety measure. It has a maximum pressure of 6 tons and is driven by a 10-horsepower motor, interconnected by three V-belts with hydraulic pump. Pressure may be adjusted from 3/4 to 6 tons. Up to 12-inch diameters may be received. Maximum and minimum daylight are 21 and 3 inches, respectively. Ram travel is adjustable from 1 to 18 inches. Work table measures 17 x 10 inches.

Check No. 10 on Reply Card for more Details

Automatic Index Machine

Index tables in sizes up to 42 inches and indexes up to 600 or more per hour are available from W. K. Millholland Machinery Co., 1048 Failfield Ave., Indianapolis 5, Ind. The machine incorporates, in a vertical position, the company's No. 5 automatic unit which has a 10 horsepower capacity and a 6-inch stroke. The horizontal side head shown is the No. 4 size with a 5 horsepower drive and a 5-inch stroke. Other units may be added to perform additional operations.

The automatic index table is independently motor driven and synchronized with the movements of the units by means of limit switches. It is arranged for continuous or intermittent operation by pushbutton



control, the operator only loading and unloading fixtures. Machine is suitable for drilling, reaming, tapping, counterboring, chamfering or spotfacing operations, accurately and to depth.

Check No. 11 on Reply Card for more Details

Fork Truck

Tract-R-Lift Corp., 605 North Aberdeen St., Chicago, Ill., is producing a compact, gas-powered fork truck, with 2000 pound capacity at 24 inches from heel of fork. Measuring 28 inches wide, 61 inches long and 60

inches high, the truck is designed for materials handling through narrow aisles and doors and in cramped quarters. Inside turning radius is 6 inches

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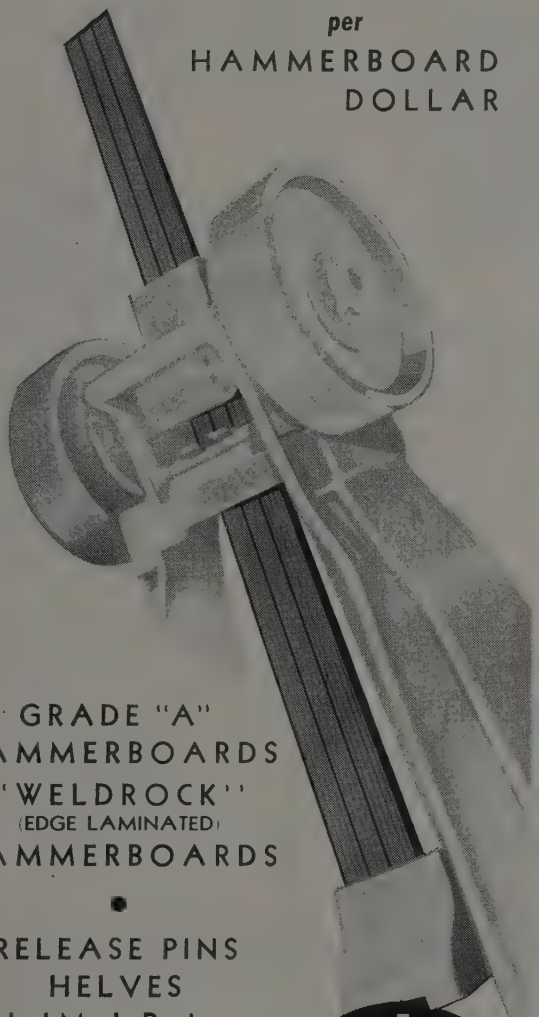
DOLLAR



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HAMMERBOARDS
"WELDROCK"
(EDGE LAMINATED)
HAMMERBOARDS

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HELVES
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49 YEARS
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Today it's a Good Idea to Investigate Every Promise of Production Cost Savings

Allison experts devote full time to a single important production operation . . . ABRASIVE CUTTING. The Allison plant is streamlined to produce . . . economically . . . a single major product . . . ABRASIVE CUTTING WHEELS. It will cost you nothing . . . and may pay you well to

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OCTOBER 25-29
BOOTH NO. 705.

255 ISLAND BROOK AVENUE BRIDGEPORT 5, CONN.
THE ALLISON COMPANY

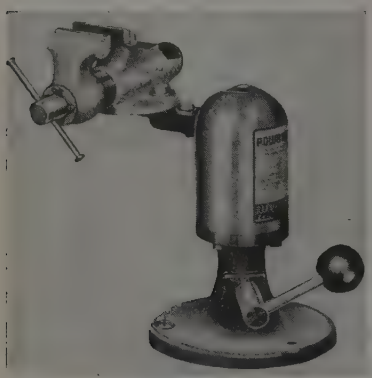
and outside radius is 67 inches.

Single hydraulic lift and tilt control lever raises or lowers forks and tilts load forward or backward. Maximum fork height with 5-foot mast is 84 inches; with 7-foot mast, 108 inches. Forks have an automatic stop at maximum lift height and are adjustable from 9 to 26 inches, outside widths. Speed is up to 10.9 miles per hour forward and 8.9 reverse, with low speed gears in both forward and reverse. Power is furnished by a 4-cylinder Waukesha ICK gasoline engine.

Check No. 12 on Reply Card for more Details

Work Holder

Pressure up to 6000 pounds per square inch may be exerted with the finger tip controlled Powrarm floating ball positioner and work holder, designed by Wilton Tool Mfg. Co., 936 Wrightwood Ave., Chicago 14, Ill. The two improved models offered



work at any desired angle on a 360 degree horizontal or axial plane or on a 180 vertical plane. One mechanically operated model is for light work, the other hydraulically operated for heavy duty work.

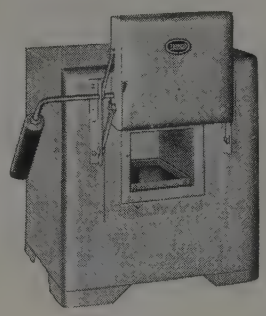
Work up to 150 pounds in weight can be held at any angle. Both models can be bolted to a work bench, or a special clamp is available to attach them to other objects. Use of the tool allows both hands to be kept free and eliminates awkward, unnatural positions.

Check No. 13 on Reply Card for more Details

Electric Furnace

Bench type electric furnaces for laboratory uses and heat treating of carbon and high chrome steel parts and tools are announced by Thermo Electric Mfg. Co., 495 West Locust St., Dubuque, Ia. Designated as series 1500, 1600 and 1700, the furnaces are offered in six sizes ranging in chamber dimensions from 4 x 3-1/2 x 4-1/2 inches to 8-1/2 x 7-1/2 x 18 inches (wide, high, deep). Fast heating furnaces may be operated up to 1650° F for continuous use and to 1900° F for short periods.

Long life of heating elements is assured by heavy gage nickel-chromium construction with a low ratio of watts per square inch of heating surface. They are embedded in refrac-



tory plates which form the sides, top and bottom of the heating chamber. All models have an uplifting counterbalanced door, except the two largest sizes in which the door is divided horizontally into two sections.

Check No. 14 on Reply Card for more Details

• • •

SOLDER ALLOY: No. 50 solder alloy, a new indium lead alloy, melts at 600° F, exhibits an extremely short plastic range and has an exceptional wettability factor. Developed by Soldering Specialties, Summit, N. J., it is available in all standard wire gages as well as ribbon form.

Check No. 15 on Reply Card for more Details

GENERAL PURPOSE COUNTER: A mechanically operated counter that is adaptable to any standard drive from either side has been designated as series 1260 by the manufacturer, Veeder-Root Inc., Hartford 2, Conn.

Check No. 16 on Reply Card for more Details

INSTANTANEOUS RESET TIMER: Series PAC timers ranging from the PAC-5S which has a timing range from 5 cycles to 5 seconds, calibrated in 5 cycle steps, to the PAC-3H, with a range from 2 minutes to 3 hours, calibrated in 2-minute steps, are offered by Industrial Timer Corp., Newark, N. J.

Check No. 17 on Reply Card for more Details

MICROMETER: The new micrometer, offered by E. J. Cady & Co., Chicago 2, Ill., calipers thicknesses of sheet materials or other articles up to ½-inch. The dead weight principle employs devices to maintain uniform measuring pressure at all times, at any point of anvil travel, whether article measured is thick or thin.

Check No. 18 on Reply Card for more Details

DRUM PUMP: General Scientific Equipment Co., Philadelphia 32, Pa., announces No. 750 pump for alcohols, paint thinners, light oils and other volatile liquids, equipped with a positive shut-off valve. Its maximum capacity is 15 gallons per minute; it has no pistons, rings, or leathers, no rotating parts.

Check No. 19 on Reply Card for more Details

LIGHT-BEAM WATTMETER: A portable light-beam wattmeter giving readings in low-wattage, low power factor ranges for frequencies of 25-3000 cycles is announced by General Electric's Meter and Instrument Division, Schenectady 5, N. Y.

Check No. 20 on Reply Card for more Details

HEATING UNIT: The 2R Red Head high frequency heating unit announced by Thermex Division, Girdler Corp., Louisville, Ky., has an output of 2.5 kilowatts, and will raise the temperature of 1 2/3 pounds of average general purpose material from 80 to 250° F in 1 minute. It operates on 230 or 460 volts, 60 cycle, three phase power supply.

Check No. 21 on Reply Card for more Details

ROTATING UNION: The new union offered by Deublin Co., Northbrook, Ill., is a leak-proof, 3-in-1 rotating joint, used in heating or cooling revolving shafts, cylinders, or drums from minus 30° F to 300° F and will handle steam, air, or liquids efficiently.

Check No. 22 on Reply Card for more Details

SELF-SYNCHRONOUS UNITS: Arma Corp., Brooklyn 32, N. Y., offers a line of synchronous units designed for electronic, electromechanical and electrohydraulic control systems, and for remote control and indicating purposes. Line includes control transformers, motors, generators, differential motors and differential generators.

Check No. 23 on Reply Card for more Details

FOR MORE INFORMATION
on the new products and equipment in this section, fill in a card. It will receive prompt attention.

Market Summary

STEEL PRICES— Inflationary forces are pushing with undiminished pressure on the steel price structure and several upward adjustments in schedules last week by a number of producers has given rise to speculation as to whether or not another broad advance is in the making. However, so far as can be determined no general increase is in prospect, at least not for the immediate future. Latest advances are attributed to rising raw material costs and adjustments to restore certain items to the profit column.

ADVANCES— Several sellers of pig iron at scattered points throughout the country last week increased prices $3 per ton following similar action earlier in the month by other producers. Silvery iron also was raised $3 per ton, and a producer of silicon sheets increased prices $50 to $75 per ton on certain grades. At the same time a platemaker upped its price $13 per ton, and another interest revised its extra list on hot-rolled sheet and strip to effect an increase of $5 to $10 per ton. One producer of alloy steel revised its grade extras with a resulting increase in price averaging $5.50 per ton. This latter producer only the week preceding had effected a reduction of $20 to $90 per ton in stainless steel forging billet prices.

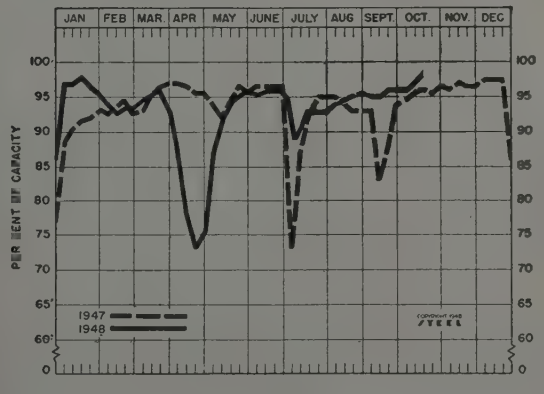
PRICE COMPOSITES— STEEL's arithmetical price composite on steelmaking pig iron has increased to $46.29 from $45.88 a week ago, reflecting increases effected by several additional producers. A year ago the composite was $36.13. Other price composites held unchanged from the preceding week with finished steel $95.05 compared with $75.41 a year ago, semi-finished steel, $75.75 against $56.80 last year, and steelmaking scrap, $43.33 compared with $39.75 at this time a year ago.

DEMAND— Pressure for steel shows no letup and buyers of the major products who have not already covered their requirements for the fourth quarter stand little chance of placing further tonnage with the mills for shipment over the remainder of this year. From all consuming quarters are heard cries for more steel with voluntary allocations to preferred programs cutting severely into available supplies of certain products. Sheet and strip continue in greatest stringency, and the shortage of these items shows no sign of easing over coming months despite the tremendous output of consumer durable goods and reported slackening of demand for such items. Plates and pipe are almost as bad, and bars, especially alloy grades, are tightening up as defense requirements begin to exert more pressure on the market.

ALLOCATIONS— Talk is heard increasingly of possible application of mandatory allocations after the turn of the year. Complaints from consumers of inability to obtain metal have been registering with congressmen, and thinking in Washington now leans to the view that mandatory allocations for steel stand a 50-50 chance of adoption after the 81st Congress convenes. This view is sparked by the fact the present voluntary allocations law expires at the end of February and the new Congress will have to consider its extension if certain programs now approved are to continue. At present, the voluntary allocations program appears to be grinding to a halt with little prospect any additional industries will get into the preferred list before the law expires.

PRODUCTION— Production of steel is being pushed at a record-breaking pace. In the first 9 months of this year more steel was produced than ever before in peacetime, total output for the period being only 2 per cent less than was produced in all of 1946. Output of ingots and steel for castings in the 9 months amounted to 64,987,478 tons, an increase of 3.6 per cent compared with 62,705,851 tons in the like months of 1947. Indications now are output for the year will total around 87 million tons, third largest in history, and greatest for any peacetime year.

STEELWORKS OPERATIONS



DISTRICT STEEL RATES

Percentage of Ingot Capacity engaged in Leading Districts

	Week Ended Oct. 16	Change	Same Week 1947	Same Week 1946
Pittsburgh	96.5	+ 0.5	105	97.5
Chicago	97.5	None	95	90
Eastern Pa.	94	None	91.5	78
Youngstown	104	None	92	91
Wheeling	90	None	93.5	89
Cleveland	98.5	+ 6.5	92	89.5
Buffalo	104	None	88.5	90.5
Birmingham	100	None	99	99
New England	87	None	84	90
Cincinnati	103	None	94	84
St. Louis	89.5	— 1.5	80	51
Detroit	101	None	88	79
Estimated national rate	98	+ 1	96	90.5

Based on weekly steelmaking capacity of 1,802,476 net tons for 1948; 1,749,928 tons for 1947; 1,762,381 tons for 1946.

COMPOSITE MARKET AVERAGES

Arithmetical Price Composites*

	Oct. 16	Oct. 9	Month Ago Sept. 1948	Year Ago Oct. 1947	5 Years Ago Oct. 1943
Finished Steel	$95.05	$95.05	$95.05	$75.41	$56.73
Semifinished Steel	75.75	75.75	75.75	56.80	36.00
Steelmaking Pig Iron	46.29	45.88	44.39	36.18	23.00
Steelmaking Scrap	43.33	43.33	43.33	39.85	19.17

FINISHED STEEL WEIGHTED COMPOSITE†

Sept. 1948	4.12679c
Aug. 1948	4.12032c
July 1948	4.06995c
Sept. 1947	3.45716c
Sept. 1943	2.44293c

*STRAIGHT ARITHMETICAL COMPOSITES: Computed from average industry-wide mill prices on Finished Carbon Steel (hot-rolled sheets, cold-rolled sheets, cold-rolled strip, hot-rolled bars, plates, structural shapes, basic wire, standard nails, tin plate, standard and line pipe), on Semifinished Carbon Steel (re-rolling billets and slabs, sheet bars, skelp, and wire rods), on Basic Pig Iron (at eight leading producing points), and on Steelworks Scrap (No. 1 melting grade at Pittsburgh, Chicago and eastern Pennsylvania). Steel arithmetical composites, dollars per net ton; pig iron and scrap, gross ton.

†FINISHED STEEL WEIGHTED COMPOSITE: Computed in cents per pound, mill prices, weighted by actual monthly shipments of following products, representing about 82 per cent of steel shipments in the latest month for which statistics are available, as reported by American Iron & Steel Institute: Structural shapes; plates, standard rails; hot and cold-finished carbon bars; black butt weld pipe and tubes; black lap weld pipe and tubes; black electric weld pipe and tubes; black seamless pipe and tubes; drawn wire; nails and staples; tin and terne plate; hot-rolled sheets; cold-rolled sheets; galvanized sheets; hot-rolled strip; and cold-rolled strip. August and September, 1948, figures are preliminary.

COMPARISON OF PRICES

Representative market figures for current week; average for last month, wire rods, cents per lb; semifinished (except wire rods) and coke, dollars three months and one year ago. Finished material (except tin plate) and per net ton, others dollars per gross ton. Delivered prices represent lowest from mills.

Finished Materials

	Oct. 16, 1948	Sept., 1948	July, 1948	Oct., 1947
Steel bars, Pittsburgh mills	3.45c	3.45c	3.105c	2.90c
Steel bars, del. Philadelphia	3.79	3.79	3.545	3.301
Steel bars, Chicago mills	3.35	3.35	3.065	2.90
Shapes, Pittsburgh mills	3.275	3.275	2.975	2.80
Shapes, Chicago mills	3.25	3.25	2.965	2.80
Shapes, del. Philadelphia	3.48	3.48	3.18	2.947
Plates, Pittsburgh mills	3.50	3.50	3.155	2.95
Plates, Chicago mills	3.40	3.40	3.115	2.95
Plates, del. Philadelphia	3.71	3.71	3.41	3.162
Sheets, hot-rolled, Pittsburgh mills	3.275	3.275	2.975	2.80
Sheets, cold-rolled, Pittsburgh	4.00	4.00	3.70	3.55
Sheets, No. 10 galv., Pittsburgh	4.40	4.40	4.10	3.90
Sheets, hot-rolled, Gary mills	3.25	3.25	2.965	2.80
Sheets, cold-rolled, Gary mills	4.00	4.00	3.70	3.55
Sheets, No. 10 galv., Gary mills	4.40	4.40	4.10	3.90
Strip, hot-rolled, Pittsburgh mills	3.50	3.50	3.140	2.80
Strip, cold-rolled, Pittsburgh mills	4.375	4.375	3.965	3.55
Bright basic, wire, Pittsburgh	4.325	4.325	3.965	3.675
Wire nails, Pittsburgh mills	5.775	5.775	5.255	4.25
Tin plate, per base box, Pitts. dist.	$6.70	$6.80	$6.74	$5.75

Semifinished

Sheet bars, mill	$67.00*	$67.00*	$62.80	$53.57
Slabs, Chicago	52.00	52.00	47.80	40.18
Rerolling billets, Pittsburgh	59.00	59.00	47.80	40.18
Wire rod ⅜ to ¼-inch, Pitts. dist.	3.775c	3.775c	3.415c	2.925c

* Nominal.

Pig Iron

	Oct. 16, 1948	Sept., 1948	July, 1948	Oct., 1947
Bessemer, del. Pittsburgh (N.&S. sides)	$48.08	$48.08	$44.08	$38.879
Basic, Valley	46.00	43.00	40.60	36.00
Basic, eastern del. Philadelphia	50.17	47.77	43.77	38.78
No. 2 fdry., del. Pgh. (N.&S. sides)	47.58	47.58	43.58	37.379
No. 2 fdry., del. Philadelphia	50.67	48.27	44.27	39.28
No. 2 foundry, Chicago	44.75	43.25	41.10	36.00
No. 2 foundry, Valley	46.50	43.50	41.10	36.50
Southern No. 2 Birmingham	43.38	43.38	40.72	34.88
Southern No. 2 del. Cincinnati	49.09	49.09	46.43	38.544
Malleable, Valley	46.50	43.50	40.30	36.50
Malleable, Chicago	45.00	43.50	41.50	36.50
Charcoal, low phos., fob Lyles, Tenn.	66.00	62.00	59.60	46.40
Ferromanganese, fob Aetna, Pa.	163.00	148.00	151.15*	151.00*

* F.o.b. cars Pittsburgh.

Scrap

Heavy melt. steel, No. 1, Pittsburgh	$42.75	$42.75	$40.75	$39.90
Heavy melt. steel, No. 2, E. Pa.	41.50	41.50	40.00	39.50
Heavy melt. steel, No. 1 Chicago	41.75	41.75	40.05	39.55
Heavy melt. steel, No. 1 Valley	42.75	42.75	40.75	39.50
Heavy melt, steel, No. 1, Cleveland	42.25	42.25	40.25	38.25
Heavy melt. steel, No. 1 Buffalo	48.25	48.15	44.30	39.00
Rails for rerolling, Chicago	64.50	64.50	57.80	51.00
No. 1 cast, Chicago	70.50	71.10	68.50	46.40

Coke

Connellsville, beehive furnace	$14.50	$14.50	$14.25	$12.15
Connellsville, beehive foundry	17.00	17.00	17.00	14.50
Chicago, oven foundry, ovens	20.40	20.40	19.86	17.50

FINISHED AND SEMIFINISHED IRON, STEEL PRODUCTS

Finished steel quoted in cents per pound and semifinished in dollars per net ton, except as otherwise noted. Prices apply on an individual producer basis to products within the range of sizes, grades, finishes and specifications produced at its plants

Semifinished Steel

Carbon Steel Ingots: Rerolling quality, standard analysis, open market, $100-105 per gross ton. Forging quality $50 per net ton, mill.

Alloy Steel Ingots: $51 per net ton, mill.

Rerolling Billets, Blooms, Slabs: $52 per net ton, mill, except $62, Conshohocken, Pa.; $66, Monessen, Pa.; sales by smaller interests on negotiated basis at $85 per gross ton, or higher.

Forging Quality Billets, Blooms, Slabs: $61 per net ton, mill, except: $68, Conshohocken, Pa., mill.

Alloy Billets, Slabs, Blooms: Rerolling quality, $63 per net ton, mill, except: $70, Conshohocken, Pa.

Sheet Bars: $67 nom., per net ton, mill; sales in open market $110-$115 per gross ton.

Skelp: 3.25c per lb, mill.

Tube Rounds: $76 per net ton, mill; some sellers quoting up to $120 per gross ton.

Wire Rods: Basic and acid open-hearth, 7/32 & ⅜-inch, inclusive, 3.40c per lb, mill, except: 3.65c, Struthers, O.; 3.70c, Worcester, Mass.; 4.05c, Pittsburg, Calif.; 4.10c, Portsmouth, O., Los Angeles; 4.15c, Monessen, Pa. One producer quotes 3.90c, Chicago base. Basic open-hearth and bessemer, not resulphurized, 7/32 to 47/64-inch, inclusive, 3.50c, mill.

Bars

Hot-Rolled Carbon Bars (O.H. only) and Bar-Size Shapes under 3-in. (Base 20 tons one size): 3.35c, mill, except: 3.55c, Ecorse, Mich., Pittsburgh, Monessen, Aliquippa, Pa.; 4.05c, Pittsburg, Torrance, Calif.; 4.10c, S. San Francisco, Los Angeles, Niles, Calif., Portland, Oreg., Atlanta, Seattle; 4.20c, Kansas City, Mo.; 4.25c, Minnequa, Colo.; 5.30c, Fontana, Calif.

Rail Steel Bars: (Base 10 tons): 3.35c, Moline, Ill.; 4.80c, Williamsport, Avis, Pa.

Hot-Rolled Alloy Bars: 3.75c, mill, except: 4.05c, Ecorse, Mich.; 4.80c, Los Angeles; 5.50c, Fontana, Calif.

Hot-Rolled Alloy Bar Shapes: 4.00c, mill.

Cold-Finished Carbon Bars (Base 20,000-39,999 lb): 4.00c, mill, except: 3.95c, Pittsburgh, Cumberland, Md.; 4.20c, Indianapolis; 4.25c, Monessen, Pa.; 4.30c, Ecorse, Mich.; 4.35c, St. Louis; 4.36c, Plymouth, Mich.; 4.40c, Newark, N. J., Hartford, Putnam, Conn., Mansfield, Readville, Mass.; 4.45c, Camden, N. J.; 5.30c, Los Angeles.

Cold-Finished Alloy Bars: 4.65c, mill, except: 4.75c, Monessen, Pa.; 4.85c, Indianapolis; 4.95c, Worcester, Mansfield, Mass., Hartford, Conn.

High-Strength, Low-Alloy Bars: 5.10c, mill, except: 5.40c, Ecorse, Mich.

Reinforcing Bars (New Billet): 3.35c, mill, except: 3.55c, Monessen, Pa.; 4.05c, Pittsburg, Torrance, Calif.; 4.10c, Atlanta, Seattle, S. San Francisco, Los Angeles; 4.25c, Minnequa, Colo. Fabricated: To consumers: 4.10c, Pittsburgh; 4.25c, S. Duquesne, Pa., Gary, Ind., Youngstown; 5.00c, Seattle.

Reinforcing Bars (Rail Steel): 4.65c, Williamsport, Pa., mill; 5.25c, Huntington, W. Va.

Wrought Iron Bars: Single Refined: 8.60c, (hand puddled), McKees Rocks, Pa.; 9.50c, Economy, Pa. Double Refined: 11.25c (hand puddled), McKees Rocks, Pa., 11.00c, Economy, Pa. Staybolt: 12.75c, (hand puddled), McKees Rocks, Pa.; 11.30c, Economy, Pa.

Sheets

Hot-Rolled Sheets (18 gage and heavier): 3.25c, mill, except: 3.25-3.30c, Cleveland; 3.30c, Pittsburgh; 3.45c, Ecorse, Mich.; 3.95c, Pittsburg, Torrance, Calif.; 5.00c. Conshohocken, Pa.; 5.65c, Fontana, Calif.; 6.25c, Kansas City, Mo.

Hot-Rolled Sheets (19 gage and lighter, annealed): 4.15c, mill, except: 4.40c, Alabama City, Ala.; 4.65c, Niles, O., 5.05c, Torrance, Calif., Kokomo, Ind.

Cold-Rolled Sheets: 4.00c, mill, except: 4.20c, Granite City, Ill., Ecorse, Mich., 4.95c, Pittsburg, Calif.

Galvanized Sheets, No. 10: (Based on 5 cent zinc) 4.40c, mill, except: 5.00c, Niles, O.; 5.15c, Pittsburg, Torrance, Calif.; 5.30c, Kokomo, Ind.

Galvannealed Sheets: 4.95c, mill, except: 5.05c, Indiana Harbor, Ind.; 5.55c, Niles, O.; 5.70c, Kokomo, Ind.

Culvert Sheets, No. 16 flat Copper Steel (based on 5-cent zinc) 5.00c, mill, except: 5.40c, Granite City, Ill.; 5.45c, Kokomo, Ind.; 5.75c, Pittsburg, Torrance, Calif.
Copper-Iron: 5.75c, Granite City, Ill.; 5.35c, Irvin, Pa., Gary, Ind.

Aluminized Sheets: Hot-dipped, coils or cut to lengths: 7.75c, Butler, Pa.

Long Ternes, No. 10 (Commercial quality): 4.80c, mill.

Enameling Sheets, No. 12: 4.40c, mill, except: 4.60c, Granite City, Ill.; 4.70c, Ecorse, Mich.; 6.00c, Niles, O.

Silicon Sheets, No. 24: Field: 5.15c, mill. Armature: 5.45c, mill, except: 6.05c, Niles, O. Electrical: Hot-rolled,* 5.95c, mill, except: 6.05c, Kokomo, Ind.; 6.15c, Granite City, Ill.; 6.55c, Niles, O.
Motor: 6.70c, mill except: 6.90c, Granite City. Dynamo: 7.50c, mill, except: 7.40c, Follansbee, W. Va., Toronto, O.; 7.70c, Granite City, Ill. Transformer 72, 8.05c, mill, except: 7.90c, Follansbee, W. Va., Toronto, O. 65, 8.60c, mill. 58, 9.30c, mill. 52, 10.10c, mill.

High-Strength Low-Alloy Sheets: Hot-rolled, 4.95c, mill, except: 5.25c, Ecorse, Mich., and Conshohocken, Pa., mills.
Galvanized (No. 10), 6.75c, mill.
Cold-rolled, 6.05c, mill, except: 6.35c, Ecorse, Mich.

Strip

Hot-Rolled Strip: 3.25c mill, except: 3.30c, Cleveland, Pittsburgh, Riverdale, Ill.; 3.25-3.35c,* Sharon, Pa.; 3.45c, Ecorse, Mich., Atlanta; 3.60c, Detroit; 3.70c, West Leechburg, Pa.; 4.00c, Pittsburg, Torrance, Calif.; 4.25c, Seattle, S. San Francisco, Los Angeles; 4.20c, Kansas City, Mo.; 4.30c, Minnequa, Colo.; 5.90c, Fontana, Calif. One company quotes 4.90c, Pittsburgh base.

* Wider than 6-in. and 6-in. and narrower, respectively.

Cold-Rolled Strip (0.25 carbon and less): 4.00c, mill, except 4.00-4.25c, Warren, O.; 4.00-4.50c, Youngstown; 4.20c, Ecorse, Mich.; 4.25c, Riverdale, Ill.; 4.40-4.50c, Detroit; 4.50c, New Haven, Conn., West Leechburg, New Castle, Pa., Boston; 4.75c, Dover, O., New Kensington, Pa.; 4.50-5.00c, Trenton, N. J.; 4.80-5.05c, Wallingford, Conn.; 5.75c, Los Angeles; 7.10c, Fontana, Calif. One company quotes 4.55c, Cleveland or Pittsburgh base, and 4.75c, Worcester, Mass., base; another, 5.00c, Pittsburgh base.

Cold-Rolled Alloy Strip: 9.50c, mill, except 9.80c, Worcester, Mass.

High-Strength, Low-Alloy Strip: Hot-rolled, 4.95c, mill, except: 5.25c, Ecorse, Mich., mill. Cold-rolled, 6.05c, mill, except: 6.35c, Ecorse, Mich., mill.

Tin, Terne Plate

Tin Plate: American Coke, per base box of 100 lb, 1.25 lb coating $6.60-$6.80; 1.50 lb coating $6.80-$7.00. Pittsburg, Calif., mill $7.35 and $7.55, respectively, for 1.25 and 1.50 lb coatings.

Electrolytic Tin Plate: Per base box of 100 lb, 0.25 lb tin, $5.80-$6.00; 0.50 lb tin, $6.00-$6.20; 0.75 lb tin, $6.20-$6.40.

Can Making Black Plate: Per base box of 100 lb. 55 to 70 lb basis weight, $5.20-$5.30; 75 to 95 lb basis weight $5.10-$5.20; 100 to 128 lb basis weight, $5.20-$5.30. $5.75-$5.95, $5.65-$5.85, $5.75-$5.95, respectively, Pittsburg, Calif.

Holloware Enameling Black Plate: 29-gage, 4.75c per pound, except: 4.85c, Sparrows Point, Md.; 4.95c, Granite City, Ill.

Manufacturing Ternes (Special Coated): Per base box of 100 lb, $5.90, except $6 Fairfield, Ala.

Roofing Ternes: Per package 112 sheets; 20 x 28 in., coating I.C. 8-lb, $15.50.

Plates

Carbon Steel Plates: 3.40c, mill, except: 3.40-3.60c, Cleveland; 3.45c, Sparrows Point, Md., Johnstown, Pa., Lackawanna, N. Y.; 3.60c, Pittsburgh; 3.65c, Ecorse, Mich.; 3.75c, Coatesville, Pa.; 3.95c, Claymont, Del., Conshohocken, Pa.; 4.30c, Seattle, Minnequa, Colo.; 4.56c, Houston, Tex.; 5.80c, Fontana, Calif.; 6.50c, Harrisburg, Pa.; 6.25c, Kansas City, Mo.

Floor Plates: 4.55c, mill.

Open-Hearth Alloy Plates: 4.40c, mill, except: 5.10c, Coatesville, Pa., mill.

High-Strength, Low-Alloy Plates: 5.20c mill, except: 5.10c, Coatesville, Pa.; 5.30c, Conshohocken, Pa., Sparrows Point, Md., Johnstown, Pa.; 5.65c, Ecorse, Mich., Sharon, Pa.

Shapes

Structural Shapes: 3.25c, mill, except: 3.30c, Bethlehem, Pa., Lackawanna, N. Y., Johnstown, Aliquippa, Pa.; 3.85c, Torrance, Calif.; 4.15c, Minnequa, Colo.; 4.30c, Seattle, S. San Francisco, Los Angeles; 5.75c, Fontana, Calif.

Alloy Structural Shapes: 4.05c, mill.

Steel Sheet Piling: 4.05c, mill.

High-Strength, Low-Alloy Shapes: 4.95c, mill, except: 5.05c, Bethlehem, Johnstown, Pa., Lackawanna, N. Y.

Wire and Wire Products

Wire to Manufacturers (carloads): Bright, Basic or Bessemer Wire, 4.15c, mill, except: 4.00c, Atlanta; 4.25c, Sparrows Point, Md., Kokomo, Ind.; 4.45c, Worcester, Mass.; 4.50c, Monessen, Pa., Minnequa, Colo., Buffalo; 4.70c, Portsmouth, O.; 4.80c, Palmer, Mass.; 5.10c, Pittsburg, Calif.; 5.15c, So. San Francisco; 5.40c, Shelton, Conn. One producer quotes 4.50c, Chicago base; another, 4.50c, Crawfordsville, Ind., freight equalized with Pittsburgh and Birmingham.

Basic MB Spring Wire, 5.55c, mill, except: 5.30c, Portsmouth, O.; 5.65c, Sparrows Point, Md., Monessen, Pa.; 5.85c, Worcester, Palmer, Mass., Trenton, N. J., 6.50c, Pittsburg, Calif.

Upholstery Spring Wire, 5.20c mill, except: 5.30c, Sparrows Point, Md., Williamsport, Pa.; 5.50c, Worcester, Mass., Trenton, N. J., New Haven, Conn.; 6.15c, Pittsburg, Calif.

Wire Products to Trade (carloads): Merchant Quality Wire: Annealed (6 to 8 Gage base), 4.80c, mill, except: 4.90c, Sparrows Point, Md., 4.95c, Monessen, Pa.; 5.10c, Worcester, Mass.; 5.15c, Minnequa, Colo., Kokomo, Ind.; 5.20c, Atlanta; 5.75c, So. San Francisco, Pittsburg, Calif. One producer quotes 5.15c, Chicago and Pittsburgh base; another, 5.20c. Crawfordsville, Ind., freight equalized with Pittsburgh and Birmingham.

Galvanized (6 to 8 Gage base), 5.25c, mill, except: 5.35c, Sparrows Point, Md.; 5.40c, Monessen, Pa.; 5.55c, Worcester, Mass.; 5.60c, Kokomo, Ind., Minnequa, Colo.; 5.65c, Atlanta; 6.20c, Pittsburg, So. San Francisco, Calif. One producer quotes 5.60c, Pittsburgh and Chicago base; another, 5.65c, Crawfordsville, Ind., freight equalized with Birmingham and Pittsburgh.

Nails and Staples: Standard, cement-coated and galvanized nails and polished and galvanized staples, Column 103, mill, except: 105, Sparrows Point, Md., Kokomo, Ind.; 109 Worcester, Mass.; 110 Minnequa, Colo., Atlanta; 117, Portsmouth, O.; 123, Pittsburg, Calif.; 124, Cleveland; 126, Monessen, Pa.; $5.20 per 100 pound keg, Aliquippa, Pa.; $6.75, Conshohocken, Pa., Wheeling, W. Va. One producer quotes column 109, Chicago and Pittsburgh base; another, column 113, Crawfordsville, Ind., freight equalized with Birmingham and Pittsburgh.

Woven Fence (9 to 15½ Gage, inclusive): Column 109, mill, except: 113 Monessen, Pa., Kokomo, Ind.; 116, Minnequa, Colo.; 121 Atlanta; 132, Pittsburg, Calif. One producer quotes column 113, Pittsburgh and Chicago base; another, column 114, Crawfordsville, Ind., freight equalized with Pittsburgh and Birmingham.

Barbed Wire: Column 123 mill, except: 125, Sparrows Point, Md., Kokomo, Ind.; 126 Atlanta; 128 Monessen, Pa.; 130, Minnequa, Colo.; 143, Pittsburg, Calif.; 145, So. San Francisco. One producer quotes 127, Chicago and Pittsburgh base.

Fence Posts (with clamps): Column 114, Duluth; 115, Johnstown, Pa.; 116, Moline, Ill.; 122, Minnequa, Colo.; $123.50 per net ton, Williamsport, Pa.

Bale Ties (single loop): Column 106, mill, except: 103, Fairfield, Ala.; 108, Sparrows Point, Md., Kokomo, Ind.; 110, Atlanta; 113 Minnequa, Colo.; 130, So. San Francisco, Pittsburg, Calif. One producer quotes column 115, Crawfordsville, Ind., freight equalized with Birmingham and Pittsburgh.

Tubular Goods

Standard Steel Pipe: Mill prices in carlots, threaded and coupled, to consumers about $200 a net ton.

In	Butt Weld Blk.	Butt Weld Gal.	In	Butt Weld Blk.	Butt Weld Gal.
⅛	41½	12½	1¼ ...	46½–	27½–
¼	39½	14		49	30
⅜	36	9	1½ ...	47–	28–
½	40½–	20–		49½	30½
	43	22½	2	47½–	28½–
¾	43½–	24–		50	31
	46	26½	2½, 3..	48–	29–
1	46–	27–		50½	31½
	48½	29½	3½ & 4	44½	25

In	Lap Weld Blk.	Lap Weld Gal.	Elec. Weld Blk.	Elec. Weld Gal.	Seamless Blk.	Seamless Gal.
2	39½	20	38½	19	27–	7½–
					38½	19
2½ ..	42½–	23–	41½	22	32½–	13–
	43½	24			41½	22
3	42½–	23–	41½	22	35–	15½–
	43½	24			41½	22
3½ & 4	42½–	23–	43½	24	38½–	19–
	46½	27			43½	24
5 & 6.	42½–	23–	43½	24	38½–	19–
	44½	25			43½	24
7	....	..	....	..	43½	23

Line Steel Pipe: Mill prices in carlots to consumers about $200 a net ton.

In	Butt Weld Blk.	Butt Weld Gal.	In	Butt Weld Blk.	Butt Weld Gal.
⅛	40½	....	1¼ ...	47–	28–
¼	38½	....		48	29
⅜	35	....	1½ ...	47½–	28½–
½	41–	20½–		48½	29½
	42	21½	2	48–	29–
¾	44–	24½–		49	30
	45	25½	2½ & 3	48½–	29½–
1	46½–	27½–		49½	30½
	47½	28½	3½ & 4	43½	

In	Lap Weld Blk.	Lap Weld Gal.	Elec. Weld Blk.	Elec. Weld Gal.	Seamless Blk.	Seamless Gal.
2	38½	19	37½	18	26–	6½–
					37½	18
2½ ..	41½–	23	40½	21	31½–	12–
	42½				40½	21
3	41½–	23	40½	21	34–	14½
	42½				40½	21
3½-4 .	41½–	22–	42½	23	37½–	18–
	45½	26			42½	23
5 & 6 .	41½–	22	42½	23	37½–	18–
	43½				42½	23
8	45½	..	44½	24	40½–	20–
					44½	24
10 ...	45	..	44	23½	41½–	21–
					44	23½
12 ...	44	..	43	22½	40½–	20–
					43	22½

Standard Wrought Iron Pipe: Mill price in carlots, threaded and coupled, to consumers about $200 a net ton.

In.	Butt Weld Blk.	Butt Weld Gal.	In.	Lap Weld Blk.	Lap Weld Gal.
⅜...	+59½	+93	1¼..	+22	+50½
½...	+20½	+50	1½..	+15½	+43
¾...	+10½	+39	2....	+ 7½	+34
1 and 1¼	+ 4½	+30	2½-3½	+ 5	+29½
1½..	— 1½	+26½	4....	List	+23½
2....	— 2	+26	4½-8	+ 2	+25
			9-12.	+12	+34½

Boiler Tubes: Net base c.l. prices, dollars per 100′, mill; minimum wall thickness, cut lengths 4 to 24″; inclusive.

O.D. In.	B.W. Ga.	Seamless Hot Rolled	Seamless Cold Drawn	Elec. Weld Hot Rolled	Elec. Weld Cold Drawn
1	13	....	13.39	13.00	13.00
1¼	13	....	15.87	13.21	15.39
1½	13	$15.05	17.71	14.60	17.18
1¾	13	17.11	20.15	16.60	19.54
2	13	19.18	22.56	18.60	21.89
2¼	13	21.37	25.16	20.73	24.40
2¼	12	23.54	27.70	22.83	26.88
2½	12	25.79	30.33	25.02	29.41
2¾	12	27.33	32.14	26.51	31.18
3	12	28.68	33.76	27.82	32.74
3¼	11	33.39	39.29	32.39	38.11
3½	11	35.85	42.20	34.78	40.94
4	10	44.51	52.35	43.17	50.78
4½	9	58.99	69.42	....	....
5	9	68.28	80.35	....	....
6	7	104.82	123.33	....	....

Rails, Supplies

Rails: Standard, over 60-lb; $3.20 per 100 lb, mill.

Light (billet): $3.55-$4.25 per 100 lb, mill.

Light (rail steel): $4.70 per 100 lb., Williamsport, Pa.

Railroad Supplies: Track bolts, treated: $8.50 per 100 lb., mill. Untreated: $8.25, mill.

Tie Plates: 4.05c mill, except: 4.20c. Pittsburg, Calif.; 4.50c, Seattle.

Splice Bars: 4.25c, mill.

Standard Spikes: 5.35c, mill, except: 5.25c, Pittsburgh.

Axles: 5.20c, mill.

Bolts, Nuts

Prices to consumers, f.o.b. midwestern plants. Sellers reserve right to meet competitors' prices, if lower. Additional discounts on carriage and machine bolts, 5 for carloads; 15 for full containers, except tire and plow bolts.

Carriage and Machine Bolts

½-in. and smaller; up to 6 in. in length	35 off
⅝ and ⅝ x 6-in. and shorter	37 off
¾-in. and larger x 6-in. and shorter	34 off
All diameters longer than 6-in.	30 off
Tire bolts	25 off
Plow bolts	47 off
Lag bolts, 6 in. and shorter	37 off
Lag bolts, longer than 6 in.	35 off

Stove Bolts

In packages, nuts separate, 58½-10 off; bulk 70 off on 15,000 of 3-in. and shorter, or 5000 over 3 in., nuts separate.

Nuts

	A.S. Light	A.S. Reg. and Heavy
Semifinished hexagon	41 off	38 off
⅞-in. and smaller	.....	.....
½-in. and smaller	39 off	37 off
⅝-in.-1-in.	.....	35 off
1⅛-in.-1½-in.	37 off	34 off
1⅝-in. and larger	34 off	28 off

Additional discount of 15 for full containers.

Hexagon Cap Screws (Packaged)

Upset 1-in. smaller by 6-in. and shorter (1020 bright)	46 off
Upset (1035 heat treated)	
⅝ and smaller x 6 and shorter	40 off
¾, ⅞, & 1 x 6 and shorter	35 off

Square Head Set Screws

Upset 1-in. and smaller	51 off
Headless, ¼-in. and larger	31 off

Rivets

F.o.b. midwestern plants

Structural ½-in. and larger	6.75c
⅞-in. and under	48 off

Washers, Wrought

Fob shipping point, to jobbers.....50c-$2 off

Tool Steels

Tool Steel: Cents per pound, producing plants; reg. carbon 19.00c; extra carbon 22.00c; special carbon 26.50c; oil-hardening 29.00c; high carbon-chromium 52.00c; chrome hot work, 29.00c.

W	Cr	V	Mo	Co	Base Per lb
18	4	1	...	...	90.50c
18	4	2	...	...	102.5c
18	4	3	...	...	114.5c
18	4	2	...	9	168.5c
1.5	4	1	8.5	...	65.00c
6.4	4.5	1.9	5	...	69.50c
6	4	3	6	...	88.00c

RAW MATERIAL AND FUEL PRICES

Minimum delivered prices do not include 3 per cent federal tax

Pig Iron

Per Gross Ton

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem, Pa., furnace	$48.00	$48.50	$49.00	$49.50
Newark, N. J., del.	50.39	50.89	51.39	51.89
Brooklyn, N. Y., del.	....	52.40	52.90	....
Philadelphia, del.	50.17	50.67	51.17	51.67
Birmingham, furnace	42.88	43.38	....	....
Cincinnati, del.	....	49.09	....	....
Buffalo, furnace	*47.00	*47.00	*47.50	48.00
Boston, del.	55.42	55.42	55.92	....
Rochester, del.	49.22	49.22	49.72	50.22
Syracuse, del.	50.025	50.025	50.525	41.025
Chicago, furnace	46.00	43.00-46.50	43.50-46.50	47.00
Milwaukee, del.	47.72	44.72-48.22	45.22-48.22	48.72
Muskegon, Mich., del.	....	47.98-51.48	48.48-51.48	....
Cleveland, furnace	46.00	46.50	46.50	47.00
Akron, del.	48.17	48.67	48.67	49.17
Duluth, furnace	....	46.00	46.50	47.00
Erie, Pa., furnace	45.50	46.00	46.50	47.00
Everett, Mass., furnace	....	48.75	49.25	....
Geneva, Utah, furnace	46.00	46.50	....	....
Seattle, Tacoma, Wash., del.	....	53.63	....	....
Portland, Oreg., del.	....	53.63	....	....
Los Angeles, San Francisco	53.13	53.63	....	....
Granite City, Ill., furnace	47.90	48.40	48.90	....
St. Louis, del.	48.65	49.15	49.65	....
Ironton, Utah, furnace	....	46.50	....	....
‡Neville Island, Pa., furnace	46.00	46.50	46.50	47.00
Pittsburgh, del., N.&S. Sides	47.08	47.58	47.58	48.08
Pittsburgh (Carnegie), furnaces	46.00	46.50	46.50	47.00
Sharpsville, Pa., furnace	46.00	46.50	46.50	47.00
Steelton, Pa., furnace	48.00	48.50	49.00	49.50
Struthers, O., furnace	42.50	....	....	....
Swedeland, Pa., furnace	50.00	50.50	51.00	....
Toledo, O., furnace	45.50	46.00	46.50	47.00
Cincinnati, del.	50.05	50.55	....	....
Youngstown, O., furnace	46.00	46.50	46.50	47.00
Mansfield, O., del.	49.87	50.37	50.37	50.87

* Republic Steel Corp. quotes $1 a ton higher for basic, No. 2 foundry and malleable at Buffalo.

‡ To Neville Island base add: $0.86 for McKees Rocks, Pa.; $1.31 Lawrenceville, Homestead, McKeesport, Monaco; $1.73 Verona; $1.94 Brackenridge; $1.08 to Ambridge and Aliquippa.

Blast Furnace Silvery Pig Iron

6.00-6.50 per cent Si (base) .$59.50
6.51-7.00 .. 60.75 9.01- 9.50. 67.00
7.01-7.50 .. 62.00 9.51-10.00. 68.25
7.51-8.00 .. 63.25 10.01-10.50. 69.50
8.01-8.50 .. 64.50 10.51-11.00. 70.75
8.51-9.00 .. 65.75 11.01-11.50. 72.00
Fob Jackson, O., per gross ton. Buffalo furnace $1.25 higher.

Bessemer Ferrosilicon

Prices same as for blast furnace silvery iron, plus $1 per gross ton. **Electric Furnace Silvery Pig Iron** Si 14.01-14.50%, $81.75 furnace, Niagara Falls; $81 open-hearth and $82 foundry grade, Keokuk, Iowa. Add $1 a ton for each additional 0.5% Si to 18%; 50c for each 0.5% Mn over 1%; $1 a ton for 0.045% max. phos.

Charcoal Pig Iron

Semi-cold blast, low phosphorus. Fob furnace, Lyles, Tenn. .....$62 (For higher silicon iron a differential over and above the price of base grade is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Low Phosphorus

Steelton, Pa., $54; Buffalo, Troy, N. Y., $50. Philadelphia, $56.81 delivered.

Intermediate phosphorus, Central furnace, Cleveland, $51.

Differentials

Prices are subject to following differentials:

Silicon: An additional charge of 50 cents a ton for each 0.25 per cent silicon in excess of base grade (1.75% to 2.25%).

Phosphorus: A reduction of 38 cents a ton for phosphorus content of 0.70 per cent and over.

Manganese: An additional charge of 50 cents a ton for each 0.50 per cent, or portion thereof, manganese in excess of 1%.

Nickel: An additional charge for nickel content as follows: Under 0.50%, no extra; 0.50% to 0.74%, inclusive, $2 a ton; for each additional 0.25% nickel, $1 a ton.

Fluorspar

Metallurgical grade, fob shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70% or more $37; less than 60% $34.

Metallurgical Coke

Price per Net Ton

Beehive Ovens

Connellsville, furnace	$13.50-15.50
Connellsville, foundry	16.00-18.00
New River, foundry	16.50
Wise county, foundry	15.35
Wise county, furnace	14.60

Oven Foundry Coke

Kearney, N. J., ovens	$21.50
Chicago, ovens	20.40
Terre Haute, ovens	21.00
Milwaukee, ovens	21.15
New England, del.	22.75
Birmingham, del.	18.66
Indianapolis, ovens	20.85
Cincinnati, del.	21.40
Ironton, O., ovens	18.25
Erie, Pa., del.	22.45
Painesville, O., ovens	20.90
Cleveland, del.	22.45
Buffalo, del.	23.10
Detroit, del.	21.65
Philadelphia, ovens	20.55
Swedeland, Pa., ovens	20.50
Portsmouth, O., ovens	19.25

Coal Chemicals

Spot, cents per gallon, ovens
(Price effective as of Aug. 5)

Pure benzol	20.00
Toluol, one degree	20.50-26.50
Toluol, two degrees	23.00-26.50
Industrial xylol	20.50-26.50

Per pound, ovens

Phenol, 40 (car lots, returnable drums)	13.00
Do., less than carlots	13.75
Do., tank cars	12.00
Naphthalene flakes, balls, bbl to jobbers, "household use"	12.00

Per ton, bulk, ovens

Sulphate of ammonia	$45.00

Refractories

(Prices per 1000 brick, fob plant)

Fire Clay Brick

Super Duty: St. Louis Vandalia, or Farber, Mo., Olive Hill, Ky., Clearfield, or Curwensville, Pa., $100.

High-Heat Duty: Salina, Pa., $85; Woodbridge, N. J., St. Louis, Farber, or Vandalia, Mo., West Decatur, Orviston, Clearfield, Beach Creek, or Curwensville, Pa., Olive Hill, Hitchins, Haldeman, or Ashland, Ky., Troup, or Athens, Tex., Stevens Pottery, Ga., Portsmouth, or Oak Hill, O., $80.

Intermediate-Heat Duty: St. Louis, or Vandalia, Mo., West Decatur, Orviston, Beach Creek, or Clearfield, Pa., Olive Hill, Hitchins, Haldeman, or Athens, Ky., Troup, Tex., Stevens Pottery, Ga., or Portsmouth, O., $74.

Low-Heat Duty: Oak Hill, or Portsmouth, O., Clearfield, Pa., Bessemer, Ala., $66.

Ladle Brick

Dry Press: $55, Freeport, Merill Station, Clearfield, Pa.; Chester, New Cumberland, W. Va.; Irondale, Wellsville, O.

Wire Cut: $53, Chester, New Cumberland, W. Va.; Wellsville, O.

Malleable Bung Brick

St. Louis, Mo., Olive Hill, Ky., $83; Beach Creek, Pa., $73.

Silica Brick

Mt. Union, Claysburg, or Sproul, Pa., Ensley, Ala., $80; Hays, Pa. $85; Joliet or Rockdale, Ill., $89; Lehi, Utah, Los Angeles, $95.

Eastern Silica Coke Oven Shapes: Claysburg, Mt. Union, Sproul, Pa., $80.

Illinois Silica Coke Oven Shapes: Joliet or Rockdale, Ill., $81.

Basic Brick

(Base prices per net ton; f.o.b. works, Baltimore or Chester, Pa.)

Chrome brick or chemical-bonded chrome brick, $69, magnesite brick, $91; chemical-bonded magnesite, $80.

Magnesite

(Base prices per net ton, fob works, Chewelah, Wash.)

Domestic dead-burned, ⅜" grains: Bulk, $31; single paper bags, $35.50.

Dolomite

(Base prices per net ton)

Domestic, dead-burned bulk: Billmeyer, Blue Bell, Williams, Plymouth Meeting, Pa., Millville, W. Va., Narlo, Millersville, Martin, Gibonsburg, Woodville, O., $11.85; Thornton, McCook, Ill., $11.95; Dolly Siding, Bonne Terre, Mo., $12.05.

Ores

Lake Superior Iron Ore

Gross ton, 51½% (natural) Lower Lake Ports

(Any increase or decrease in R. R. freight rates, dock handling charges and taxes thereon effective after Apr. 1, 1948, are for buyer's account.)

Old range bessemer	$6.60
Old range nonbessemer	6.45
Mesabi bessemer	6.35
Mesabi nonbessemer	6.20
High phosphorus	6.20

Eastern Local Ore

Cents, units, del. E. Pa.

Foundry and basic 56.62% contract 15.25

Foreign Ore

Cents per unit, cif Atlantic ports

Swedish basic, 60 to 68% ... 14.50
Brazil iron ore, 68-69% 18.50

Tungsten Ore

Wolframite and scheelite per short ton unit, duty paid ..... $26-$28

Manganese Ore

48-50%, duty paid, fob cars, New York, Philadelphia, Baltimore, Norfolk, Va., Mobile, Ala., New Orleans, 67.60c-72.60c.

Chrome Ore

Gross ton fob cars, New York, Philadelphia, Baltimore, Charleston, S.C., plus ocean freight differential for delivery to Portland, Oreg., and/or Tacoma, Wash. (S S paying for discharge; dry basis, subject to penalties if guarantees are not met.)

Indian and African

48% 2.8:1	$37.50
48% 3:1	39.00
48% no ratio	31.00

South African (Transvaal)

44% no ratio	$25.50-$26.00
45% no ratio	26.50
48% no ratio	29.00-30.00
50% no ratio	29.50-30.50

Brazilian—nominal

44% to 2.5:1 lump	$33.65

Rhodesian

45% no ratio	$27-$27.50
48% no ratio	30.00
48% 3:1 lump	39.00

Domestic (seller's nearest rail)

48% 3:1	$39.00

Molybdenum

Sulphide conc., lb., Mo., cont., Mines $0.75

WAREHOUSE STEEL PRICES

Prices, cents per pound, for delivery within switching limits, subject to extras.

	SHEETS			STRIP		BARS				PLATES	
	H-R 10 Ga.	C-R 17 Ga.	Gal. *10 Ga.	†H-R	†C-R	H-R Rds. ⅜" to 3"	C-F Rds. ½" & up	H-R Alloy **4140	Standard Structural Shapes	Carbon ⅜"-¾"	Floor ¾" & Thicker
Boston (city)..	5.84	6.64	7.84	6.04	6.90	5.69	6.39	8.24-9.74	5.54	5.89	7.34
Boston (c'try).	5.69	6.49	7.69	5.89	6.75	5.54	6.24	8.09-9.59	5.39	5.74	7.19
New York (city)	5.73-5.80	6.73	7.74-7.83	6.08-6.28	...	5.83	6.58	8.22	5.52-5.78	5.98	7.48
New York (c'try)	5.53-5.60	6.53	7.54-7.63	5.88-6.08	...	5.63	6.38	...	5.32-5.58	5.78	7.28
Phila. (city) ..	5.50-5.86	6.61-6.81	7.42-7.62	5.46-5.81	...	5.57-5.65	6.31	7.94	5.24-5.40	5.52-5.65	6.73-7.16
Phila. (c'try) ..	5.35-5.71	6.46-6.66	7.27-7.47	5.31-5.66	...	5.42-5.50	6.16	7.79	5.09-5.25	5.37-5.50	6.58-7.01
Balt. (city) ...	5.43†	6.33	7.13	5.49	...	5.54	...	...	5.48	5.68	7.13
Balt. (c'try)...	5.28†	6.18	6.98	5.34	...	5.39	...	...	5.33	5.53	6.98
Norfolk, Va. ..	5.75	...	...	...	...	6.00	7.00	...	6.00	6.00	7.50
Wash. (w'house)	5.81-5.97	...	...	5.87	...	5.88-5.92	...	...	5.82-5.86	6.02-6.06	7.47-7.51
Buffalo (del.)..	5.20-5.25	5.95-6.00	7.75	5.70	6.50	5.35	6.05	9.50	5.25	5.60	7.70
Buff. (w'house)	5.05-5.10	5.80-5.85	7.60	5.55	6.35	5.20	5.90	9.40	5.10	5.45	7.55
Pitts. (w'house)	4.85-5.00§	5.75-5.85[5]	7.00-7.05	5.00-5.35	5.95-6.00	4.90-5.10	5.65	7.65	4.90-5.15	5.05-5.25	6.55
Det. (w'house) .	5.40-5.75§	6.30-6.60	7.60	5.40-5.70	6.50	5.45	6.17	8.12	5.45	5.65-5.80	7.10
Cleveland (del.)	5.13-5.29	6.00-6.29	7.34-7.49	5.17-5.69	6.85	5.30-5.34	6.05-6.10	7.94-8.29	5.34-5.60	5.50-5.54	6.95-6.99
Cleve. (w'hse) .	4.98-5.75	5.75-6.14	7.19-7.85	5.02-5.54	6.70	5.15-5.19	5.90-5.95	7.79-8.14	5.19-5.45	5.35-5.39	6.80-6.84
Cincin. (w'hse)	5.26	6.11	7.60	5.52	6.07	5.52	6.07	...	5.37	5.61	6.91
Chicago (city).	5.20	5.90‡[8]	7.20	5.00	6.30	5.05	5.85	7.80[9]	5.05	5.25	6.70
Chicago (w'hse)	5.05	5.75‡[8]	7.05	4.85	6.15	4.90	5.70	7.65[9]	4.90	5.10	6.55
Milwaukee (city)	5.37	6.07‡[8]	7.37	5.17	6.47	5.22	6.02	7.97[9]	5.22	5.42	6.87
St. Louis (del.)	5.34§	6.24[8]	7.44	5.34	6.64	5.39	6.19[12]	6.64	5.39	5.59	7.04
St. L. (w'hse).	5.19§	6.09[8]	7.29	5.19	6.49	5.24	6.04[12]	9.49	5.24	5.44	6.89
Birm'ham (city)	5.20§	...	6.60	5.20	...	5.15	6.66	...	5.15	5.40	7.41-7.66
Birm'ham (c'try)	5.05§	...	6.45	5.05	...	5.00	6.51	...	5.00	5.25	7.26-7.51
Omaha, Nebr...	6.07	...	9.33	6.07	...	6.12	6.92	...	6.12	6.32	7.77
Los Ang. (city)	6.55§	8.05	8.20†	6.75	9.50	6.20	8.00-8.50	...	6.70	6.40	8.15
Los Angeles (w'house) ...	6.40§	7.90	8.05†	6.60	9.35	6.05	7.35-8.35	...	6.55	6.25	8.00
San Francisco..	5.95[21]	7.15	8.05	6.75[21]	8.25[18]	5.90[21]	7.55	10.20‡‡	5.90	7.60	8.10
Seattle-Tacoma .	6.35[17]	7.90[5]	8.40	6.70[17]	...	6.20[17]	8.15[1]	9.45[2]	6.30[17]	6.35[17]	8.40[17]

Base Quantities: 400 to 1999 lb except as noted: Cold-rolled strip, 2000 lb and over; cold finished bars, 1000 lb and over; galvanized sheets, 450 to 1499 lb; [1]—1500 lb and over; [2]—1000 to 4999 lb; [3]—450 to 39,999 lb; [4]—three to 24 bundles; [5]—450 to 1499 lb; [6]—400 to 14,999 lb; [8]—400 to 1499 lb; [9]—1000 to 1999 lb; [11]—1000 to 39,999 lb; [12]—1000 lb and over; [15]—2000 lb and over; [17]—300 to 999 lb; [18]—1500 to 1999 lb; [19]—1500 to 39,999 lb; [20]—400 to 3999 lb; [21]—400 lb and over; [22]—500 to 1499 lb; [28]—Price (but not other price in range) applies to any and all quantities.

* Includes gage and coating extra, except Birmingham (coating extra excluded); † does not include gage extras; ‡ 15 gage; § 18 gage and heavier; ** as rolled; †† add 0.40 for sizes not rolled in Birmingham.

PRICES OF LEADING FERROALLOYS PRODUCTS

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si) Carlot per gross ton, $57, Palmerton, Pa.; $66, Pittsburgh and Chicago; (16% to 19% Mn.) $1 per ton lower.

Standard Ferromanganese: (Mn 78-82%, C 7% approx.). Carload, lump, bulk $160 per gross ton of alloy, c.l., packed, $172; gross ton lots, packed, $187; less gross ton lots, packed, $204; fob Alloy, W. Va., Niagara Falls, N. Y.; or Welland, Ont. Base price; $165, Rockwood, Tenn.; $162, f.o.b. Birmingham and Johnstown, Pa., furnaces; $160, Sheridan, Pa.; $163, Aetna, Pa. Shipment from Pacific Coast warehouses on one seller add $31 to above prices, fob Los Angeles, San Francisco, Portland, Oreg. Shipment from Chicago warehouse, ton lots, $201; less gross ton lots, $218 fob Chicago. Add or subtract $2 for each 1%, or fraction thereof, of contained manganese over 82% and under 78%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 80-85%). Carload, lump, bulk, max. 0.10% C, 24.75c per lb of contained Mn, carload packed 26.0c, ton lot 27.1c, less ton 28.3c. Delivered. Deduct 0.5c for max. 0.15% C grade from above prices, 1c for max. 0.30% C, 1.5c for max. 0.50% C, and 4.5c for max. 0.75% C—max 7% Si. **Special Grade:** (Mn 90% approx., C 0.07% max., P 0.06% max.). Add 0.5c to above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max., Si 1.5% max.). Carload, lump, bulk 18.15c per lb of contained Mn, carload packed 18.9c, ton lot 20.0c, less ton 21.2c. Delivered. Spot, add 0.25c.

Manganese Metal: (Mn 96% min., Fe 2% max., Si 1% max., C 0.20% max.). Carload, 2" x D, packed 35.5c per lb of metal, ton lot 37c, less ton 39c. Delivered. Spot, add 2c.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk, 1.50% C grade, 18-20% Si, 8.6c per lb of alloy, carload packed, 9.35c, ton lot 10.25c, less ton 11.25c. Freight allowed. For 2% C grade, Si 15-17.5%, deduct 0.2c from above prices. Spot, add 0.25c.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 20.5c per lb of contained Cr, c.l., packed 21.4c, ton lot 22.55c, less ton 23.95c. Delivered. Spot, add 0.25c.

"SM" High-Carbon Ferrochrome: (Cr 60-65%, Si 4-6%, Mn 4-6%, C 4-6%). Add 1.1c to high-carbon ferrochrome prices.

Foundry Ferrochrome: (Cr 62-66%, C 5-7%). Contract, c.l., SMxD, bulk 22.0c per lb. of contained Cr, c.l., packed 22.9c, ton lot 24.25c, less ton 26.0c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Contract, carload, lump, bulk, max. 0.03% C 31.85c per lb of contained Cr, 0.04% C 29.75c, 0.05% C 29.25c, 0.06% C 28.75c, 0.10% C 28.25c-28.5c, 0.15% C 28.0c, 0.20% C 27.75c, 0.50% C 27.5c, 1% C 27.25c, 2% C 27.0c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

"SM" Low-Carbon Ferrochrome: (Cr 62-66%, Si 4-6%, Mn 4-6%, add C 1.25% max.). Contract, carload, lump, bulk 27.75c per lb of contained chromium, carload, packed 28.85c, ton lot 30.05c, less ton 31.85c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome, Nitrogen Bearing: Add 5c to 0.10% C low-carbon ferrochrome prices for approx. 0.75% N. Add 5c for each 0.25% of N above 0.75%.

Chromium Metal: (Min 97% Cr and 1% Fe). Contract, carload, 1" x D; packed, max. 0.50% C grade, $1.03 per lb of contained chromium, ton lot $1.05, less ton $1.07. Delivered. Spot, add 5c.

SILICON ALLOYS

20-30% Ferrosilicon: Contract, carload, lump, bulk, 16.50-17.50c per lb of contained Si; packed 18.90c; ton lots 20.00c, fob Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 10.5c per lb of contained Si, carload packed 12.1c, ton lot 13.55c, less ton 15.2c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.) Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon: Contract, carload, lump, bulk, 13.0c per lb of contained Si, carload packed 14.3c, ton lot 15.45c, less ton 16.7c. Delivered. Spot, add 0.3c.

80-90% Ferrosilicon: Contract, carload, lump, bulk 14.65-15c per lb of contained Si, carload packed 15.9c, ton lot 16.9c, less ton 18.05c. Delivered. Spot, add 0.25c.

Low-Aluminum 85% Ferrosilicon: (Al 0.50% max.). Add 0.7c to 85% ferrosilicon prices.

90-95% Ferrosilicon: Contract, carload, lump, bulk, 16.5c per lb of contained Si, carload packed 17.7c, ton lot 18.65c, less ton 19.7c. Delivered. Spot, add 0.25c.

Low-Aluminum 90-95% Ferrosilicon: (Al 0.50% max.) Add 0.7c to above 90-95% ferrosilicon prices.

Silicon Metal: (Min. 97% Si and 1% max. Fe.). C.l., lump, bulk, regular 19.0c per lb of Si c.l. packed 20.2c, ton lot 21.1c, less ton 22.1c. Add 1.5c for max. 0.10% calcium grade. Deduct 0.4c for max. 2% Fe grade analyzing min. 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe).

Contract, basis fob Niagara Falls, N. Y., lump per lb cl 6.90c; ton lots packed, 7.40c; 200 to 1999 lb, 8.15c, smaller lots 8.65c; or, lump, carload, bulk, 8.40c per lb of alloy, packed c.l. 9.20c, ton lots 9.30c, 200 to 1000 lb 9.65c, less 200 lb 10.15c per lb of alloy. Delivered. Spot up 0.5c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3¾ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 13.75c per lb of briquet, carload packed 14.45c, ton lot 15.25c, less ton 16.15c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

(Please turn to Page 244)

Aluminum, Antimony Prices Rise

Aluminum Co. of America raises pig and ingot aluminum prices 1 cent per pound and makes similar adjustments in product prices. National Lead raises antimony 3.50 cents

New York — Price increases in aluminum and antimony featured developments in nonferrous metal markets last week. During the same period, heavier demand for copper, lead and zinc was reported.

According to trade reports, the Economic Co-operation Administration is investigating charges that some European countries have purchased lead and zinc here at American prices, while selling tonnages to United States consumers at premium rates. Meanwhile, industry sources said Belgium and Italy have been told informally that they would not obtain ERP funds for lead purchases because their production was held adequate for their internal needs.

Aluminum — Aluminum Co. of America, Pittsburgh, advanced 99 per cent aluminum pig and ingot one cent a pound, effective Oct. 11, to 16 and 17 cents per pound, respectively. Similar upward adjustment in prices for aluminum sheets, rounds and other products were put into effect on same date.

Company's new prices on basic pig and ingot are comparable to or lower than those quoted by other primary producers, both foreign and domestic, R. V. Davies, vice president and general sales manager, stated. The average price of all company's products remains below prewar averages in contrast to the major uptrend in prices of other metals and materials. Company advanced its prices one cent on June 28 last, following an advance in wages.

Antimony — National Lead Co. advanced its price of antimony to 38.50c a pound, Laredo, Tex., effective as of Oct. 8, for the RMM brand in bulk, and 39.00c for the Lone Star brand. This represents an advance of 3.50 cents from the 35-cent level which had been in effect since May 22. The upward adjustment is attributed to the increase in production costs.

Copper — Shipments of refined copper, including both domestic and foreign metal, to American industry during September were the largest monthly deliveries in one and one-half years. September shipments totaled 123,188 tons compared with 107,496 tons in August. Last month's movement of copper to manufacturers' plants exceeded any month since March, 1947, when the total was 123,382 tons, according to the Copper Institute. On the basis of orders already booked for October shipment, industry members predict that the current month's deliveries will compare favorably with the high rate recorded in September.

Imports of refined copper into the United States totaled 21,198 tons during August compared with 25,023 tons in July, making the receipts for the first eight months of this year 160,509 tons compared with only 82,160 tons in the like period a year ago, according to the Bureau of the Census. Imports of blister copper totaled 11,219 tons compared with 14,037 tons in July and 20,384 tons in June.

Report on the outcome of the stockpiling meeting which was held in Washington last week is published on page 97 of this issue.

Lead — Receipts of lead in ore and scrap declined further during August because of the strike at the St. Joseph Lead Co. properties during that period. Total receipts during the month amounted to 31,911 tons compared with 33,332 tons in July and 44,858 tons in June when operations were not hampered by the strike, according to the American Bureau of Metal Statistics. Receipts of domestic lead in ore in August totaled 23,141 tons compared with 24,597 tons in July. Receipts of foreign lead in ore dropped sharply to only 3983 tons from 6347 in the preceding month. Receipts of lead in scrap increased to 4787 tons from 2388 in July.

For the first eight months of this year, total receipts of lead in ore and scrap amounted to 326,999 tons, or about 28,300 tons less than the total for the like 1947 period.

Total stocks of lead held by smelters and refiners as of Sept. 1 were 117,297 tons compared with 117,285 on Aug. 1, the smallest tonnages reported since Jan. 1, 1943. A decline of about 3940 tons in stocks of refined lead to 12,921 tons were more than offset by gains in stocks in base bullion at smelteries and refineries and in transit to refineries. The tonnage at smelteries and refineries rose to 10,584 tons from 7713 tons on Aug. 1 while the tonnage in transit to refineries increased to 4063 tons from 2931 tons.

Stocks in ore and matte and in process at smelteries declined slightly to 67,044 tons from 67,894 on Aug. 1. Antimonial lead stocks totaled 6050 tons on Sept. 1 compared with 5989 on Aug. 1.

Zinc — Zinc production declined 3459 tons further in September to a total of 64,721 tons, the smallest monthly output since October, 1946. This reflects the continued strike at the American Zinc, Lead & Smelting Co.'s plants. Daily average production was 2157 tons, the lowest rate reported since October, 1946. Total smelter production for the first nine months of 1948 amounted to 631,498 tons compared with 635,604 tons in the like period a year ago.

Shipments to domestic consumers declined 2722 tons to a total of 60,990 tons, the smallest reported since November, 1947. Shipments on export and drawback account amounted to 5083 tons compared with 4893 tons in August, bringing total export deliveries for the first nine months to 57,987 tons compared with 91,114 in the like period a year ago. During September, 2777 tons of zinc were transferred to the permanent government stockpile, making a total of 26,603 for that purpose so far this year compared with 63,411 tons during the like period in 1947.

Stocks of zinc at smelters dropped 4129 tons to a total of 41,117 tons as of Sept. 30. This represents the smallest supply since August, 1942, when stocks were 36,652 tons.

Unfilled orders dropped 9400 tons further to 50,939 tons compared with 72,224 tons as of Feb 28, the peak for the year. This decline is due mainly to the fact that smelters generally are accepting orders now only for the current and the next ensuing month's delivery.

Tin—World mine production of tin in July was equivalent to 12,600 tons of fine tin, according to the Statistical Office of the International Tin Study Group, compared with 9200 tons in July, 1947. For the seven months ended July 31, production of tin came to 84,500 tons against 59,600 during the like period in 1947.

World consumption of tin in July is estimated at 11,400 tons, making a total of 81,300 for the first seven months, or 3200 less than mine production and 6500 less than smelter production of refined tin which is placed at 87,800 tons for the January-July period.

The latest figures on world stocks of tin and tin in concentrates are those for June 30 of 142,000 tons compared with 130,600 at the beginning of the year and 121,300 as of Aug. 31, 1947. Thus, stocks have increased 20,700 tons during the last 10 months. These stock figures do not include what is in the United States government's permanent stockpile which is some 12,000 tons.

Shipments of Straits tin in September amounted to 5782 tons of which 4085 tons were from Penang and 1697 tons from Singapore. The United States received 4550 tons of the September shipments.

Silver—After advancing to 77.50c an ounce on continued heavy domestic demand, silver prices stabilized at that level last week.

Remelt Aluminum Output Dips

Washington — Production of aluminum ingot at secondary smelters declined 7 per cent in July, totaling 14,251 short tons compared with 15,312 tons in June, according to the Bureau of Mines. The trend toward increased receipts of the less desirable grades of aluminum scrap by smelters, which had been noted in June, continued in July, with receipts of borings and turnings, aircraft scrap, and irony aluminum outweighing consumption. Although stocks of scrap at ingot-makers' plants increased substantially in these two months, the greater part of the increase occurred in the low-grade scrap items, effecting a lowering in the average quality of scrap inventories held by that class of consumers.

Consumption of aluminum scrap by ingot makers declined 5 per cent, totaling 16,152 tons in July compared with 16,964 tons in the preceding month. Use of new scrap dropped 16 per cent, but the loss was partly offset by a 13 per cent gain in consumption of old scrap.

NONFERROUS METAL PRICES

(Cents per pound, carlots, except as otherwise noted)

Copper: Electrolytic, 23.50c, Conn. Valley; Lake, 23.62½c, Conn. Valley.

Brass Ingot: 85-5-5-5 (No. 115) 20.50-22.00c; 88-10-2 (No. 215) 31.00c; 80-10-10 (No. 305) 27.25c; No. 1 yellow (No. 405) 17.00-17.50c.

Zinc: Prime western 15.00c, brass special 15.25c, intermediate 15.50c, East St. Louis; high grade 16.00c, delivered.

Lead: Common 19.30-19.35c, chemical and corroding 19.40c, St. Louis.

Primary Aluminum: 99% plus, ingots 17.00c, pigs 16.00c. Base prices for 10,000 lb and over, fob shipping point, freight allowed.

Secondary Aluminum: Piston alloy (No. 122 type) 23.00-24.00c; No. 12 foundry alloy (No. 2 grade) 22.75-23.50c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 24.00-25.25c; grade 2, 23.25-24.50c; grade 3, 22.50-24.00c; grade 4, 22.00-23.50c. Prices include freight at carload rate up to 75 cents per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over, 20.50c, fob Freeport, Tex.

Tin: Grade A, 99.8% or higher (including Straits) $1.03; grade B, 99.8% or higher, not meeting specifications for grade A, with 0.05% max. arsenic, $1.028; grade C, 99.65-99.79%, incl., $1.024; 99.5-99.649% $1.024, grade F, 98-98.999% $1.015 for tin content. Prices are ex-dock, New York, in 5-ton lots.

Antimony: American 99-99.8% and over but not meeting specifications below, 38.50c; 99.8% and over (arsenic 0.05% max.; other impurities, 0.1% max.) 39.00c, fob Laredo, Tex., for bulk shipments.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 40.00c; 25-lb pigs, 42.50c; shot nom.; "XX" nickel shot, 43.50c; "F" nickel shot or ingots, for addition to cast iron, 40.50c. Prices include import duty.

Mercury: Open market, spot, New York $76-$78 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, $24.50 per lb contained Be.

Cadmium: "Regular" straight or flat forms, $1.90, del.; special or patented shapes, $2.

Cobalt: 97-98%, $1.65 per lb for 550 lb (keg); $1.67 per lb for 100 lb (case); $1.72 per lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, New York, 77.50c per ounce.

Platinum: $93-$96 per ounce.

Palladium: $24 per troy ounce.

Iridium: $110-$115 per troy ounce.

Titanium (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Base prices, cents per pound, fob mill)

Sheet: Copper 37.18; yellow brass 33.75; commercial bronze, 95%, 37.11; 90%, 36.63; red brass, 85%, 35.64; 80%, 35.16; best quality, 34.63; nickel silver, 18%, 46.41; phosphor-bronze, grade A, 5%, 56.05.

Rods: Copper, hot rolled 33.03; cold drawn 34.28; yellow brass, free cutting, 33.44; commercial bronze, 95% 36.80; 90% 36.32; red brass, 85% 35.33; 80% 34.85.

Seamless Tubing: Copper 37.22; yellow brass 36.76; commercial bronze 90% 39.29; red brass 85% 38.55; 80% 38.07.

Wire: Yellow brass 34.04; commercial bronze, 95% 37.40; 90% 36.92; red brass, 85% 35.93, 80% 35.45; best quality brass 34.92.

Copper Wire: Bare, soft, fob eastern mills, c.l. 29.42½c, l.c.l. 29.92½-30.05c; weatherproof, fob eastern mills, c.l. 29.60-29.85c, l.c.l. 30.35c; magnet, delivered, c.l. 32.75-33.50c, 15,000 lb or more 33.00-33.75c, l.c.l. 33.50-34.25c.

ALUMINUM

Sheets and Circles: 2S and 3S mill finish c.l. (Two producers quote 1-cent per pound lower.)

Thickness Range, Inches	Widths or Diameters, In., Incl.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	26.9	...	...
0.135-0.096	12-48	27.4	...	...
0.095-0.077	12-48	27.9	26.0	29.6
0.076-0.068	12-48	28.5	26.2	29.8
0.067-0.061	12-48	28.5	26.2	29.8
0.060-0.048	12-48	28.7	26.4	30.1
0.047-0.038	12-48	29.1	26.6	30.4
0.037-0.030	12-48	29.5	27.0	30.9
0.029-0.024	12-48	29.9	27.3	31.3
0.023-0.019	12-36	30.5	27.7	31.8
0.018-0.017	12-36	31.1	28.3	32.6
0.016-0.015	12-36	31.8	28.9	33.5
0.014	12-24	32.7	29.7	34.6
0.013-0.012	12-24	33.6	30.4	35.5
0.011	12-24	34.6	31.3	36.7
0.010-0.0095	12-24	35.6	32.3	38.0
0.009-0.0085	12-20	36.8	33.4	39.5
0.008-0.0075	12-20	38.1	34.6	41.1
0.007	12-18	39.5	35.9	42.9
0.006	12-18	41.0	37.2	47.0

* Minimum length, 60 inches. † Maximum diameter, 24 inches.

Screw Machine Stock: 5000 lb and over.

Diam. (in.) or distance across flats	—Round— R317-T4, 17S-T4	R317-T4	—Hexagonal— 17S-T4
0.125	48.0	...	...
0.156-0.203	41.0	...	...
0.219-0.313	38.0	...	...
0.344	37.0	...	47.0
0.375	36.5	45.5	44.0
0.406	36.5	...	...
0.438	36.5	45.5	44.0
0.469	36.5	...	...
0.500	36.5	45.5	44.0
0.531	36.5	...	...
0.563	36.5	...	41.5
0.594	36.5	...	...
0.625	36.5	43.0	41.5
0.656	36.5	...	...
0.688	36.5	...	41.5
0.750-1.000	35.5	40.5	39.0
1.063	35.5	...	37.5
1.125-1.500	34.5	39.0	37.5
1.563	34.5	...	37.5
1.625	33.5	...	36.5
1.688-2.000	33.5	...	...
2.125-2.500	32.5	...	...
2.625-3.375	31.5	...	...

LEAD

(Prices to jobbers, fob Cleveland, Pittsburgh) Sheets: Full rolls, 140 sq ft or more, $23.25 per cwt.; add 50c per cwt., 10 sq ft to 140 sq ft; $1.25, less than 10 sq ft; $1, circles and segments. Pipe: Full coils, $22.50 per cwt; cut coils, $22.75. Traps and Bends: List price plus 70%.

ZINC

Sheets, 19.50-20.00c, fob mill, 36.00 lb and over. Ribbon zinc in coils, 18.25c-19.00c, fob mill, 36,000 lb and over. Plates, not over 12-in., 17.25c; over 12-in., 18.25c.

NICKEL

(Base prices, fob mill.)

Sheets, cold-rolled, 60.00c. Strip, cold-rolled 66.00c. Rods and shapes, 56.00c. Plates 58.00c. Seamless tubes, 89.00c.

MONEL

(Base prices, fob mill.)

Sheets, cold-rolled 47.00c; Strip, cold-rolled, 50.00c. Rods and shapes, 45.00c. Plates, 46.00c. Seamless tubes, 80.00c. Shot and blocks, 40.00c.

MAGNESIUM

Extruded Rounds, 12 in. long, 1.312 in. in diameter, less than 25 lb, 52.00-56.00c; 25 to 99 lb, 42.00-46.00c; 100 lb to 4000 lb., 35.00-36.00c.

DAILY PRICE RECORD

	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
Sept. Avg.	23.500	19.325	15.000	103.000	16.500	35.000	40.000	75.284
Aug. Avg.	23.230	19.325	15.000	103.00	16.269	35.000	40.000	73.790
Oct. 1	23.50	19.30–19.350	15.000	103.00	16.00–17.000	35.000	40.000	76.500
Oct. 4	23.50	19.30–19.350	15.000	103.00	16.00–17.000	35.000	40.000	77.000
Oct. 5	23.50	19.30–19.350	15.000	103.00	16.00–17.000	35.000	40.000	77.250
Oct. 6-9	23.50	19.30–19.350	15.000	103.00	16.00–17.000	35.000	40.000	77.500
Oct. 11-14	23.50	19.30–19.350	15.000	103.00	17.000	38.500	40.000	77.500

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. E. St. Louis; Zinc, prime western, del. St. Louis; Tin, Straits, del. New York; Aluminum, primary ingots, 99%, del.; Antimony, bulk, fob Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery, unpacked; Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

Plating Materials

Chromic Acid: 99.9%, flake, fob Philadelphia, carloads, 26.00c; 5 tons and over 26.50c; 1 to 5 tons, 27.00c; less than 1 ton, 27.50c.

Copper Anodes: Base, 2000 to 5000 lb; fob shipping point, freight allowed: Flat untrimmed, 33.84c; oval 33.34c; electrodeposited, 31.09c; cast, 30.12c.

Copper Cyanide: 70-71% Cu, 100-lb drums, 46.00c, fob Niagara Falls, N. Y.

Sodium Cyanide: 96-98%, ½-oz ball, in 200 lb drums, 1 to 900 lb, 16.00c; 1000 to 19,900 lb, 15.00c, fob Niagara Falls, N. Y.

Copper Carbonate: 54-56% metallic Cu; 50 lb bags, up to 250 lb, 26.25c; over 250 lb, 25.25c, fob Cleveland.

Nickel Anodes: Rolled oval, carbonized, carloads, 56.00c; 10,000 to 30,000 lb, 57.00c; 3000 to 10,000 lb, 58.00c; 500 to 3000 lb, 59.00c; 100 to 500 lb, 61.00c; under 10 lb, 64.00c; fob Cleveland. Add 1 cent for rolled depolarized.

Nickel Chloride: 100-lb kegs, 26.50c; 275-lb, or 500-lb bbl, 24.50c, fob Cleveland.

Tin Anodes: Bar, 1000 lb and over 119.00c; 500 to 999 lb, 119.50c; 200 to 499 lb, 120.00c; less than 200 lb, 121.50c; ball, 1000 lb and over, 121.25c; 500 to 999 lb, 121.75c; 200 to 499 lb, 122.25c; less than 200 lb, 123.75c fob Sewaren, N. J.

Sodium Stannate: 25 lb cans only, less than 100 lb, to consumers 71.8c; 100 or 300 lb drums only, 100 to 500 lb, 63.6c; 600 to 1900 lb, 61.2c; 2000 to 9900 lb, 59.4c. Prices fob Sewaren, N. J.

Zinc Cyanide: 100-lb drums 39.25c, fob Cleveland; 39.00c, Detroit; 38.00c, fob Philadelphia.

Stannous Sulphate: Less than 2000 lb, in 100 lb kegs, 100.00c, in 400 lb bbl. 99.00c; more than 2000 lb, in 100 lb kegs, 99.00c, in 400 lb bbl, 98.00c.

Scrap Metals

BRASS MILL ALLOWANCES

(Based on 23.50c, Conn., for copper)

Prices in cents per pound for less than 15,000 lb fob shipping point.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	21.125	21.125	20.375
Yellow brass	18.000	17.750	17.125
Commercial Bronze			
95%	20.125	19.875	19.375
90%	19.750	19.500	19.000
Red brass			
85%	19.750	19.500	19.000
80%	19.500	19.250	18.750
Best Quality (71-79%)	19.000	18.750	18.250
Muntz Metal	17.250	17.000	16.500
Nickel, silver, 10% ..	19.625	19.375	9.813
Phos. bronze, A.	22.625	22.375	21.375
Naval brass	17.750	17.500	17.000
Manganese bronze ...	17.750	17.500	16.875

BRASS INGOT MAKERS BUYING PRICES

(Cents per pound, fob shipping point, carload lots)

No. 1 copper 19.25, No. 2 copper 18.25, light copper 17.25, composition red brass 16.00, auto radiators 13.25, heavy yellow brass 11.50, brass pipe, 12.25.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 20.00-20.25, No. 2 copper 19.00-19.25, light copper 18.00-18.25, refinery brass (60% copper), per dry copper content 18.25.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots or more)

Copper and Brass: Heavy copper and wire No. 1 17.50-18.00, No. 2 16.50-17.00, light copper 15.50-15.75, No. 1 composition red brass 13.75-14.00, No. 1 composition turnings 13.25-13.50, mixed brass turnings 8.00-8.25, new brass clippings 13.00-14.00, No. 1 brass rod turnings 10.50-11.00, light brass 7.50-8.00, heavy yellow brass 9.75-10.00, new brass rod ends 11.00-11.50, auto radiators, unsweated 11.50-12.00, cocks and faucets 11.25-11.75, brass pipe 11.00-11.50.

Lead: Heavy 17.50-18.00, battery plates 11.75, linotype and stereotype 18.00-18.50, electrotype 16.50-17.00, mixed babbitt 15.75-16.25, solder joints, 19.75-20.25.

Zinc: Old zinc 7.75-8.25, new die cast scrap 7.50-8.00, old die cast scrap 4.50-5.00.

Tin: No. 1 pewter 65.00-67.00, block tin pipe 83.00-84.00, No. 1 babbitt 51.00-54.00, siphon tops 50.00-52.00.

Aluminum: Clippings 2S 12.00-12.50, old sheets 9.00-9.50, crankcase 9.00-9.50, borings and turnings 5.50-6.00, pistons, free of struts, 9.00-9.50.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Prices are dollars per gross ton, including broker's commission, delivered at consumer's plant except where noted.

PITTSBURGH

No. 1 Heavy Melt. Steel	$42.50-43.00*
No. 2 Heavy Melt. Steel	42.50-43.00*
No. 1 Busheling	42.50-43.00*
Nos. 1, 2 Bundles	42.50-43.00
No. 3 Bundles	40.50-41.00
Machine Shop Turnings	37.50-38.00
Mixed Borings, Turnings	37.50-38.00
Short Shovel Turnings.	39.50-40.00
Cast Iron Borings	39.50-40.00
Bar Crops and Plate..	49.00-50.00
Low Phos. Steel	49.50-50.00
Heavy Turnings	39.50-40.00

Cast Iron Grades

No. 1 Cupola	65.00-66.00
Machinery Cast	72.00-73.00
Charging Box Cast	61.00-62.00
Heavy Breakable Cast.	60.00-61.00
Malleable	74.00-75.00
Brake Shoe	57.50-58.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	43.50-44.00
R.R. Malleable	75.00-80.00
Axles	55.25-56.25
Rails, Rerolling	59.00-60.00
Rails, Random Lengths	55.00-57.00
Rails, 3 ft and under..	62.00-63.00
Rails, 18 in. and under	63.00-64.00
Railroad Specialties	60.25-61.25
Uncut Tires	**54.50-55.00**
Angles, Splice Bars	53.00-54.00

* Plus applicable freight springboard.

CLEVELAND

No. 1 Heavy Melt. Steel	$42.00-42.50*
No. 2 Heavy Melt. Steel	42.00-42.50*
No. 1 Busheling	42.00-42.50*
Nos. 1 & 2 Bundles	42.00-42.50*
Machine Shop Turnings	37.00-37.50
Mixed Borings, Turnings	36.50-38.50
Short Shovel Turnings.	38.00-38.50
Cast Iron Borings	38.00-38.50
Bar Crops and Plate..	47.00-47.50
Punchings & Plate Scrap	47.00-47.50
Heavy Turnings	42.00-43.00
Alloy Free Turnings	40.00-41.00
Cut Structurals	48.50-51.50

Cast Iron Grades

No. 1 Cupola	73.00-75.00
Charging Box Cast	59.00-61.00
Stove Plate	59.00-61.00
Heavy Breakable Cast.	54.00-56.00
Unstripped Motor Blocks	58.00-60.00
Malleable	79.00-81.00
Brake Shoes	52.00-53.00
Clean Auto Cast	72.00-74.00
No. 1 Wheels	58.00-60.00
Burnt Cast	57.00-59.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	43.00-44.00*
R.R. Malleable	80.00-82.00
Rails, Rerolling	60.00-66.00
Rails, Random Lengths	60.00-63.00
Rails, 3 ft and under..	63.00-66.00
Cast Steel	57.00-59.00
Railroad Specialties	60.00-62.00
Uncut Tires	57.00-58.00
Angles, Splice Bars	61.00-63.00

* Plus applicable freight springboard on earmarked material.

VALLEY

No. 1 Heavy Melt. Steel	$42.50-43.00*
No. 2 Heavy Melt. Steel	42.50-43.00
No. 1 Bundles	42.50-43.00
Machine Shop Turnings	37.00-39.00
Short Shovel Turnings.	39.00-39.50
Cast Iron Borings	38.50-39.00
Low Phos.	48.50-50.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	43.00-44.00*

* Plus applicable freight springboard.

MANSFIELD

Machine Shop Turnings	$37.50-38.00
Short Shovel Turnings.	39.50-40.00

CINCINNATI

No. 1 Heavy Melt. Steel	$42.00
No. 2 Heavy Melt. Steel	42.00
No. 1 Busheling	42.00
Nos. 1 & 2 Bundles	42.00
Machine Shop Turnings	36.00
Mixed Borings, Turnings	36.00
Short Shovel Turnings.	38.00
Cast Iron Borings	37.00

Cast Iron Grades

No. 1 Cupola Cast	63.00
Charging Box Cast	53.00
Heavy Breakable Cast.	59.00
Stove Plate	55.00
Unstripped Motor Blocks	56.00
Brake Shoes	50.00
Clean Auto Cast	63.00
Drop Broken Cast	71.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	43.00
R.R. Malleable	75.00
Rails, Rerolling	62.00
Rails, Random Lengths	58.00
Rails, 18 in. and under	63.00

DETROIT

(Brokers' buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	$37.50-38.00
No. 1 Busheling	37.50-38.00
Nos. 1 & 2 Bundles	37.50-38.00
No. 3 Bundles	37.50-38.00
Machine Shop Turnings	31.50-32.00
Mixed Borings, Turnings	31.50-32.00
Short Shovel Turnings.	32.50-33.00
Cast Iron Borings	32.50-33.00
Punchings & Plate Scrap	42.50-43.00

Cast Iron Grades

No. 1 Cupola Cast	60.00-65.00
Heavy Breakable Cast.	54.00-59.00
Clean Auto Cast	60.00-65.00

BUFFALO

No. 1 Heavy Melt. Steel	$48.00-48.50
No. 2 Heavy Melt. Steel	41.75-42.25
No. 1 Busheling	41.75-42.25
No. 1 & 2 Bundles	41.75-42.25
Machine Shop Turnings	36.75-37.25
Mixed Borings, Turnings	36.75-37.25
Cast Iron Borings	37.75-38.25
Short Shovel Turnings.	38.75-39.25
Low Phos.	49.00-50.00

Cast Iron Grades

Mixed Cupola	65.50-66.50
No. 1 Cupola	68.00-69.00
Heavy Breakable Cast.	55.00-57.00
Malleable	70.00-75.00
Clean Auto Cast	62.00-64.00

Railroad Scrap

Rails, 3 ft. and under.	61.00-62.00
Railroad Specialties	60.00-61.00

PHILADELPHIA

No. 1 Heavy Melt. Steel	$45.00-45.50
No. 2 Heavy Melt. Steel	41.50
No. 1 Busheling	41.50
Nos. 1 & 2 Bundles	41.50
No. 3 Bundles	39.50
Machine Shop Turnings	37.50
Mixed Borings, Turnings	37.50
Short Shovel Turnings.	38.50
Bar Crop and Plate	50.00-51.00
Punchings & Plate Scrap	50.00-51.00
Cut Structurals	50.00-51.00
Elec. Furnace Bundles.	47.00-48.00
Heavy Turnings	45.50-46.50
No. 1 Chemical Borings	46.00-46.50

Cast Iron Grades

No. 1 Cupola Cast	63.00-65.00
No. 1 Machinery Cast.	67.00-68.00
Charging Box Cast	64.00-65.00
Heavy Breakable Cast.	62.00-62.50
Unstripped Motor Blocks	59.50
Malleable	76.00-78.00
Clean Auto Cast	64.00-65.00
No. 1 Wheels	69.00-70.00

NEW YORK

(Brokers buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	$39.00
No. 2 Heavy Melt. Steel	37.00
No. 1 Busheling	37.00
Nos. 1 & 2 Bundles	37.00
No. 3 Bundles	35.00
Machine Shop Turnings	29.00-29.50
Mixed Borings, Turnings	29.00-29.50
Short Shovel Turnings.	30.00-31.50
Punchings & Plate Scrap	42.00-42.50
Cut Structurals	42.00-42.50
Elec. Furnace Bundles.	42.00-42.50

Cast Iron Grades

No. 1 Cupola Cast	57.00-58.00
Charging Box Cast	57.00-58.00
Heavy Breakable	58.00
Unstripped Motor Blocks	53.50-54.50
Malleable	68.00-69.00

BOSTON

(Fob shipping point)

No. 1 Heavy Melt. Steel	$38.90
No. 2 Heavy Melt. Steel	34.40
No. 1 Bundles	34.40
No. 1 Busheling	34.40
Machine Shop Turnings	29.30
Mixed Borings, Turnings	29.90
Short Shovel Turnings.	31.90
Bar Crops and Plate	40.00-41.00
Punchings & Plate Scrap	40.00-41.00
Chemical Borings	37.00-38.00

Cast Iron Grades

No. 1 Cupola Cast	60.00-65.00
Heavy Breakable Cast.	60.00-62.00
Stove Plate	54.00-55.00
Unstripped Motor Blocks	50.00-52.00
Clean Auto Cast	54.00-56.00

CHICAGO

No. 1 Heavy Melt. Steel	$41.50-42.00
No. 2 Heavy Melt. Steel	41.50-42.00
No. 1 Bundles	41.50-42.00
No. 2 Bundles	41.50-42.00
No. 3 Bundles	39.50-40.00
Machine Shop Turnings	36.50-37.00
Mixed Borings, Turnings	36.50-37.00
Short Shovel Turnings.	38.50-39.00
Cast Iron Borings	37.50-38.00
Bar Crops and Plate..	47.00-48.00
Punchings	48.00-49.00
Elec. Furnace Bundles.	42.50-43.00
Heavy Turnings	41.00-41.50
Cut Structurals	46.50-47.00

Cast Iron Grades

No. 1 Cupola Cast	70.00-71.00
Clean Auto Cast	70.00-71.00
No. 1 Wheels	59.00-61.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	45.00-46.00
Malleable	81.00-82.00
Rails, Rerolling	64.00-65.00
Rails, Random Lengths	57.00-58.00
Rails, 3 ft and under..	60.00-61.00
Rails, 18 in. and under	62.00-63.00
Railroad Specialties	55.50-56.50
Angles, Splice Bars	56.50-57.50

ST. LOUIS

No. 1 Heavy Melt. Steel	$44.00-45.00
No. 2 Heavy Melt. Steel	40.00-41.00
Machine Shop Turnings	35.00-36.00
Short Shovel Turnings.	36.50-37.50

Cast Iron Grades (Fob shipping point)

No. 1 Cupola Cast	65.00-66.00
Mixed Cast	56.00-58.00
Heavy Breakable Cast.	59.00-60.00
Brake Shoes	60.00-61.00
Clean Auto Cast	65.00-67.00
Burnt Cast	59.00-60.00

Railroad Scrap

R. R. Malleable	71.00-72.00
Rails, Rerolling	63.00-65.00
Rails, Random Lengths	56.00-59.00
Rails, 3 ft and under..	60.00-61.00
Uncut Tires	51.00-52.00
Angles, Splice Bars	54.00-56.00

BIRMINGHAM

No. 1 Heavy Melt. Steel	$39.50
No. 2 Heavy Melt. Steel	39.50
No. 1 Busheling	39.50
Nos. 1 & 2 Bundles	39.00
No. 3 Bundles	37.00
Long Turnings	24.50
Short Shovel Turnings.	26.00-27.00
Cast Iron Borings	25.00
Bar Crops and Plate..	40.00
Cut Structurals	38.50

Cast Iron Grades

No. 1 Cupola Cast	63.00
Stove Plate	60.00-62.00
No. 1 Wheels	59.00-61.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	38.00
R.R. Malleable	nom.
Axles, Steel	50.00
Rails, Rerolling	53.00-55.00
Rails, Random Lengths	45.00-48.00
Rails, 3 ft and under..	53.00-55.00
Angles and Splice Bars	52.00-53.00

SAN FRANCISCO

No. 1 Heavy Melt. Steel	*27.50
No. 2 Heavy Melt Steel	*27.50
No. 1 Busheling	*27.50
Nos. 1 & 2 Bundles	*27.50
No. 3 Bundles	*24.50
Machine Shop Turnings	*18.00
Bar Crops and Plate..	*27.50
Cast Steel	*27.50
Alloy Free Turnings	*18.00
Cut Structurals	*27.50

Cast Iron Grades

No. 1 Cupola Cast	50.00-65.00

Railroad Scrap

No. 1 Heavy Melting	*28.50
Axles	*34.00
Rails, Random Lengths	*29.00

* Fob California shipping point.

SEATTLE

No. 1 Heavy Melt. Steel	$27.50
No. 2 Heavy Melt. Steel	27.50
No. 1 Busheling	27.50
Nos. 1 & 2 Bundles	27.50
No. 3 Bundles	24.50
Machine Shop Turnings	21.00-22.50
Mixed Borings, Turnings	21.00-22.50
Punchings & Plate Scrap	35.00
Cut Structurals	26.00-28.00

Cast Iron Grades

No. 1 Cupola Cast	45.00
Heavy Breakable Cast.	35.00
Stove Plate	30.00
Unstripped Motor Blocks	32.50
Malleable	40.00
Brake Shoes	35.00
Clean Auto Cast	40.00
No. 1 Wheels	37.50-40.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	28.50
Railroad Malleable	30.00
Rails, Random Lengths	30.00-32.00
Angles and Splice Bars	28.50

LOS ANGELES

No. 1 Heavy Melt. Steel	$27.50
No. 2 Heavy Melt. Steel	27.50
Nos. 1 & 2 Bundles	27.50
Machine Shop Turnings	20.00
Mixed Borings, Turnings	15.50-16.00
Punchings & Plate Scrap	28.00
Elec. Furnace Bundles.	28.00

Cast Iron Grades

No. 1 Cupola Cast	55.00-65.00

HAMILTON, ONT.

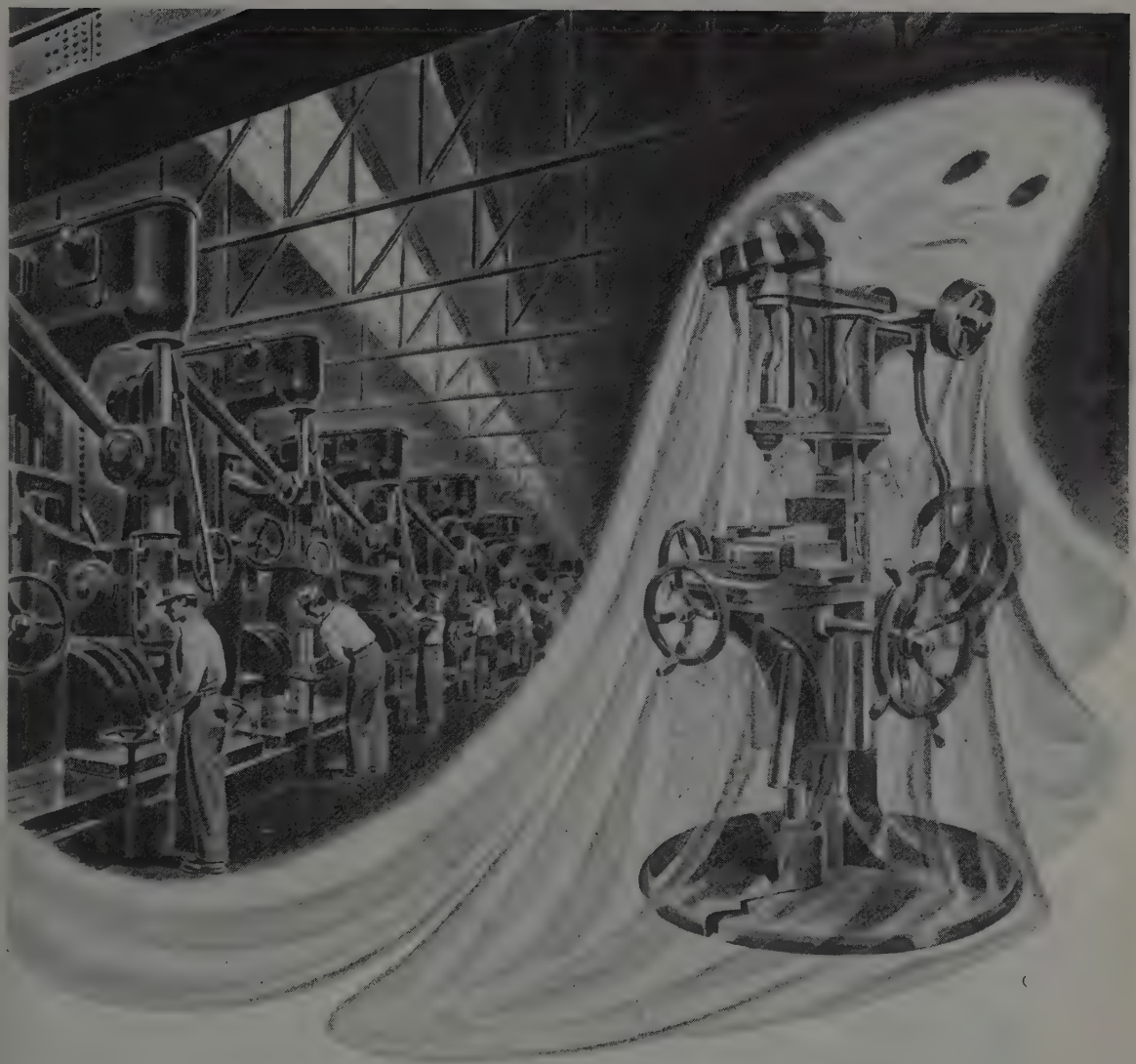
(Ceiling prices, delivered)

Heavy Melt.	$22.00
No. 1 Bundles	22.00
Mechanical Bundles	20.00
Mixed Steel Scrap	19.00
Mixed Borings, Turnings	17.00
Rails, Remelting	28.00
Rails, Rerolling	26.00
Bushelings	17.00
Bushelings, new factory, prep'd	21.00
Bushelings, new factory, unprep'd	16.00
Short Steel Turnings	17.00

Cast Iron Grades*

No. 1 Cast	42.00-48.00
No. 2 Cast	35.00-37.00

* Removed from price control Aug. 9, 1947; quoted on basis of fob shipping point.



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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Sheets, Strip . . .

Silicon sheet prices, hot-rolled and stainless extras revised by some sellers

Sheet Prices, Page 224

Pittsburgh — Increased production costs have forced producers to review their quotations on sheet and strip items. One major producer of hot-rolled sheets and strip put into effect on Oct. 1 the following upward revisions in its extra cards: Hot-rolled sheets, $3 to $9 a ton on gage and width extras; $3 to $7 on length extras; $4 to $7 on pickling and oiling; and $5 on box annealing or normalizing.

Hot-rolled strip, $8 to $11 on gage and width extras; $3 to $12, cutting to length extras; $2 to $7 for pickling and oiling; and $5 for heat treating. This interest is no longer quoting size extras for hot-rolled strip under 1 inch.

It is reported a leading producer has advanced hot-rolled silicon sheet prices Oct. 11 as follows: Motor from $6.70 to $9.20; dynamo from $7.50 to $10, an increase of $50 a ton. Transformer grades were advanced $75 per ton as follows: Transformer 72 from $8.05 to $11.80; transformer 65 from $8.60 to $12.35; and transformer 58, from $9.30 to $13.05. Similar price advances were reportedly put into effect on company's cold-rolled silicon sheet products.

Carnegie-Illinois Steel Corp. has reduced its stainless steel sheet combined gage and polishing extras to following levels in dollars per 100 lb. on gages affected. The reductions range from 75 cents to $142.75 per 100 pounds.

	No. 4 Finish				
Gage	One Side	Both Sides	Gage	One Side	Both Sides
15.....	....	20.75	24.....	27.00	55.50
16.....	....	21.25	25.....	34.75	69.00
17.....	....	22.00	26.....	34.75	69.00
18.....	....	23.25	27.....	41.00	78.50
19.....	....	26.25	28.....	46.00	85.00
20.....	....	30.00	29.....	57.25	101.25
21.....	....	32.50	30.....	70.50	122.25
22.....	22.25	46.75	31.....	100.00	178.00
23.....	25.75	52.50			

New York — District sheet consumers report no easing in the major grades. Galvanized sheets and enameling stock still appear to be in tightest supply, with cold-finished sheets next and hot sheets following. Some improvement, however, is noticeable in silicon sheets, with supply definitely easier than it was several months ago. Some consumers complain that they are not able to obtain as much tonnage as they would like to have, but admit that supply is in closer balance with demand than at any time in the past few years. This may be due in part to increased producing facilities and in part to the fact that demand is not quite as strong as it was, indicating that the pent-up requirements for small motors, in particular, are becoming better satisfied. Supply and demand on stainless sheets are in fair balance, with shipments still available within eight weeks.

Cleveland — Allotment of carbon sheets and plates under voluntary allocations programs is making it increasingly difficult to obtain tonnage of these products for use outside the programs. Although only slightly more than 9 per cent of total finished steel production is to be allocated under the program, the impact of them is falling in product categories where demand already is heaviest, such as carbon sheets and plates. One producer pointed out that demand is relatively slack for some of the other products, such as wire items.

Chicago—District sheetmakers are studying their extra cards with an eye to possible revision. Demand shows no signs of moving into line with supply and the shortage is moving increasingly into other items than those initially affected. Stainless sheets are becoming increasingly tight as the result of two factors: Larger aircraft requirements and shorter chromium and nickel supply. Delivery delay on stainless averages more than three months.

Cincinnati — Fourth-quarter shipping schedules of district sheet mills are being followed without any major disturbance from new allocations. A principal object is to greatly reduce carryover. Although quotas have been cut, mills are shipping this month against arrearages so that total tonnage received by customers in the quarter may not be far from the volume in previous quarters this year. Pressure for sheets continues unabated. First-quarter books have not been opened.

Detroit — Upward adjustments in extras covering normalizing, pickling and size on hot-rolled sheets and strips were instituted Oct. 1 by Great Lakes Steel Corp., this city. Increases have

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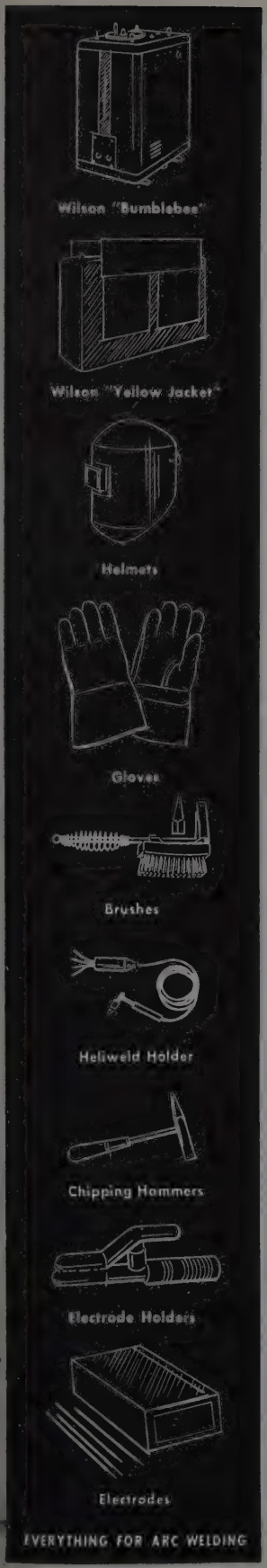

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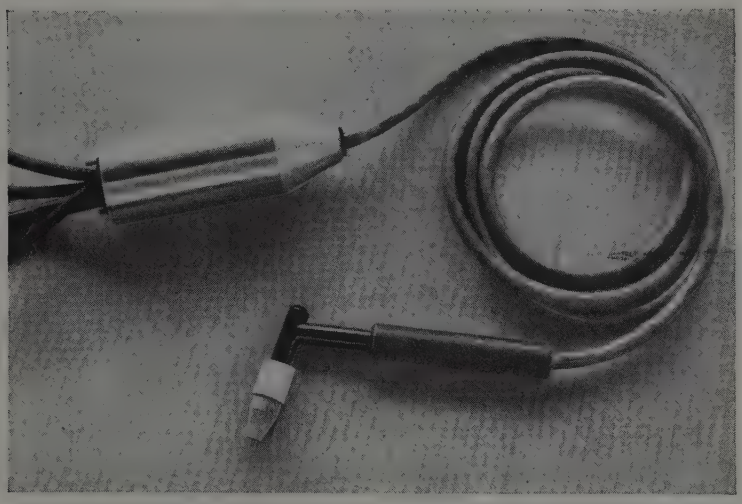

The NEW Airco manual Heliweld holder has been designed for continuous inert-gas-shielded-arc production welding. Its features include:

. . . a complete water cooling system

. . . all-plastic exterior insulation for maximum protection and efficient operation

. . . a gas cap made of light, non-conducting material

. . . extra-long, flexible cable, encased in a rugged, plastic cover

The NEW Airco manual Heliweld holder weighs about 28 ounces and has a current capacity of 300 amperes (AC or DC). It is fully insulated for high-frequency current—almost a "must" for arc-starting and welding stabilization.

The water-cooling feature of this new holder is highly important. It extends almost to the point where the electrode is gripped, insuring an efficient, cool "hand-hold" at all times.

For further information about the NEW Airco manual Heliweld holder, write for booklet ADC-653; address: Dept. S-8742, Air Reduction, 60 East 42nd Street, New York 17, N. Y. In Texas: Magnolia Airco Gas Products Company, Houston 1, Texas. On West Coast: Air Reduction Pacific Company, San Francisco 4, California.

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been necessitated by actual current costs and apply to approximately 10 per cent of the mill's overall tonnage. Normalizing and pickling extras both have been raised from $5 to $10 per ton; changes in size extras vary widely, depending upon the customer's requirements. No change has been made in base prices.

St. Louis — Sheet production in this distrit continues to improve slightly, with Granite City Steel Co.'s new cold reduction mill ranging between 50 and 60 per cent of capacity. Lengthy temper mill adjustments have been completed and the shear line and cleaning line remain the principal barrier to the full 40,000 ton rate. Some December space on fourth-quarter rolling schedules has been filled, but no non-priority orders have been accepted for the first quarter. Company still hopes to be current by the yearend—for the first time since the war—and wants to open the first-quarter books with a clean slate early in November. Customer pressure for sheets has increased as a result of the allocations program, but a good portion of Granite City's output already was under an allocations classification. The others are reported taking the 10 per cent diversion philosophically.

Plates . . .

Plate Prices, Page 225

New York — Plate fabricators still complain of inability to obtain an adequate amount of steel. Some assert they are not able to even maintain a prewar normal rate of operations for this reason. Others claim they are receiving almost as much as they did before the war, but that in view of expanded capacity of the last few years they are running far short of what they could use. The oil industry, either directly or indirectly, probably is receiving the heaviest portion of the plates now being shipped, notwithstanding the fact that they are pressing for considerably more than they are getting. Railroad car buying has dropped off sharply since mid-summer, but car shops still have substantial backlogs on hand and are hopeful of producing at least 10,000 cars per month well into 1949. Under existing voluntary allocation programs, steel shipments are being set up on a basis that should supply car builders with enough for this rate of operation.

Philadelphia — Plate demand continues to exceed supply with no indications of important easing for some months to come. Despite a recent let-up in freight car buying, order backlogs at the car shops are still in excess of 100,000 cars. Oil and gas industries are clamoring for far more tonnage than they are receiving. Shipwork nevertheless expanding with substantially more work in prospect for next year. Tank work will likely be sustained for some time.

Certified requirements, including some of the work mentioned above, will take more than one-third of production until the end of February and, while certifications may not be extended beyond that time on most of the tonnage now involved, much of the demand will be there just the same.

The Harrisburg, Pa., producer has advanced plate prices $13 a ton to a basis of 6.50c per pound, mill.

Seattle — Smaller plants, which cannot command substantial tonnages of plates, are handicapped as they cannot bid for larger projects. They are struggling to maintain normal operations in the face of increasing shortage of materials. The maritime strike is an added handicap.

Semifinished Steel . . .

Semifinished Prices, Page 224

Pittsburgh — Carnegie-Illinois Steel Corp. reduced its stainless steel forging billet prices $1.50 to $4.50 per 100 pounds, effective Oct. 7, to following levels, except on types 501 and 502, which remain unchanged:

Type	Forging Billets	Type	Forging Billets
301, 302	$24.25	347	$32.75
302B	25.00	403	22.00
303, 305	26.25	405	20.75
304	25.50	410	19.50
308, 321	29.00	414, 416	20.00
309	35.75	420	24.25
309S	39.50	430	20.00
310	47.50	430F, 431	20.50
314	48.50	440A, B, C	24.25
316	39.00	446	28.00
317	49.00	501	10.75
318	46.50	502	11.75

Carnegie's price action on billets brings its quotations in line with some other major interests. However, there continues a relatively wide price range on stainless semifinished as well as finished steel products among industry members.

Steel Bars . . .

Bar Prices, Page 224

Boston—Users of carbon steel bars are taking allocations in full and the trend toward heavier consumption of alloys, including at least one forge shop, is gradually extending deliveries on those grades. Hot-rolled carbon and alloy bars for cold finishing by nonintegrated mills are becoming tighter as more primary producers are allocating heavier tonnage to their own cold drawing departments. Heavy demand for heat-treated stock taxes mill equipment and bars are frequently shipped to be processed by the consumer. This is bolstering volume for independent heat-treating shops. While withdrawals on bars in this area are less than on some other products, notably flat-rolled, some producers are reducing tonnage to develop markets nearer their mills, knowing that when steel supply becomes freer the district consumer will buy from nearest mills.

New York — Although bars are not under as heavy pressure from consumers as flat rolled products or pipe, supply is still short of requirements. Most leading producers set up lighter quotas for the fourth quarter, but actual shipments may run as heavy as heretofore, if not heavier. Demand for cold-drawn bars is still broadening. Some sellers have not as yet opened their books for tonnage beyond the end of the year, but other cold drawers have been accepting future tonnage on a fairly selective basis.

Philadelphia — Demand for bars is brisk, with small forgers pressing more actively for tonnage than at any time this year. Inquiry is diversified. Some consumers of hot carbon bars are receiving enough tonnage to balance requirements, but they are the distinct exception. With regard to cold-drawn carbon bars and hot and cold alloys, balance between supply and demand is appreciably closer, although consumers, not already covered, are finding it difficult to pick up tonnage in these classifications for shipment over the remainder of the year. One leading alloy producer has just opened books for first quarter.

Actual requirements of hot bars for the tanker program, as set up under voluntary allocations, are 890 tons a month. Next to sheets and strip, which have been revised a bit to 486 tons, this is the smallest item on the list, with pipe at 1190 tons, shapes at 5189 tons and plates, by far the largest item, at 32,625 tons. OIC has scheduled public hearings Oct. 21 on a plan to provide 10,190 tons of steel monthly during January and February for merchant ship construction, conversion and repars.

Pittsburgh — Current heavy demand is distributed throughout the entire size range of alloy bars and there is little variation in requirements between various product classifications. Tightening supply situation in alloy bars is attributed in part to voluntary allotments for the military program and in part to the fact that some producers have discontinued production of alloy bars, resulting in additional pressure on other interests. Reduction of about 10 per cent in fourth-quarter mill allotments is expected to adversely affect operating schedules of nearly all consumers. Most concerns have been operating on a hand-to-mouth supply basis. One cold-finished bar producer is expected soon to be forced to further curtail production schedules below 50 per cent, although the company is getting as much steel as in prewar days. As in the case of many concerns, the low rate of operations reflects a substantial increase in production facilities during the last few years.

Chicago—While virtually all producers think the allocation program has bitten as deeply into steel supply as it can without necessitating an allocation program which would embrace all industries and some think this point has already been passed, there are some bright spots as the result of the program from the producer's standpoint. Outstanding among these is the possibility of lumping a program participant's orders together to make tonnage rolling of one size practical. This is vitally important to smaller producers and has made possible a sizable expansion of production without increases in capacity. Railroad carbuilders appear to have been a principal beneficiary of the increased bar output made possible in this way.

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Structural Shapes . . .

Structural Shape Prices, Page 225

Chicago—Although there is apparently no let-up in the number of small jobs, a large part of the industrial construction projected in this postwar period appears either to have been completed or shelved because of high costs and insufficiency of steel. Federal, state and local governments are accounting for the bulk of construction at this time, although costs have been instrumental in many cases for the abandonment or redesign of their projects Schools and other institutions seem particularly pinched by budgetary limitations.

Pittsburgh — An increasing volume of structural fabrication work is being held up by the growing scarcity of plates and shapes. This situation has been accentuated by the decision of one large producer to withdraw from this market. Supply of plates is more critically short than that of shapes, due primarily to heavy commitments for railroad car construction, tankers and atomic energy programs and to the tremendous demand for line pipe. The limited steel supply is a major reason why barge builders are unable to promise deliveries within 12 months. Most fabricators will bid on new work only on the basis of a specified delivery time after receipt of necessary steel.

New York — Although structural demand in this district continues to taper, 13,000 tons have been placed by the United Nations project in mid-Manhattan and 14,000 tons for a state viaduct in Brooklyn are pending. Despite general easing, fabricating shops continue to be booked well ahead, possibly averaging four and one-half to five months.

Boston — Less structural tonnage is being estimated, both public and private construction inquiry slackening, but there is no improvement in availability of plain material. Numerous fabricating shops are committed beyond current quarter allocations and are acquiring fill-in tonnage with difficulty. Larger shop deliveries extend six months with backlogs including substantial ratio of power plant work. High costs boost public work estimates on firm bid basis beyond appropriations and is delaying calls for tenders, including readvertisement of work previously rejected because of costs which have since increased.

Philadelphia — Structural activity continues spotty, with more public than private work being figured. Fabricators still have considerable work on hand and complain about their inability to keep balanced inventories.

Seattle — Fabricating plants, struggling for months in the face of inadequate supplies, have been warned by the mills that the situation will be worse in the first quarter. Two local fabricators report 1000 tons of material are tied up on idle intercoastal ships.

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Tin Plate . . .

Tin Plate Prices, Page 225

Pittsburgh — Tin plate output this year should exceed the record established in 1947, while output for 1949 is expected to reach a new all-time high. A number of companies are completing modernization programs, emphasizing the speeding up of electrolytic lines. Additional production facilities include a new mill at Aliquippa Works of Jones & Laughlin Steel Corp., and at the West Coast plant of Columbia Steel Co. Additional tin plate also is expected to be produced by Granite City Steel Co. next year. Some increase in electrolytic tin plate specifications has developed, with some companies reporting electrolytic output close to 50 per cent of overall production. Peak in food pack tin plate requirements has passed for this year with general line can demand taking up the slack. Most can companies continue to press mills for as much tin plate as possible to augment depleted inventories.

Chicago—Fears that first-quarter tin plate quotas will be lower because of delays in receipt of new equipment for the mill have been expresed by one producer in the district. The chance of this occurring, however, is "remote," the interest states. Progressive expansion and modernization programs which are going on in many steel mills with almost no interruption to production call for the closets co-ordination between existing and new facilities and when, as in this case, slow deliveries interfere with plans, production losses seem unavoidable.

Warehouse . . .

Warehouse Prices, Page 227

Chicago—Lack of balance in warehouse inventories has become more serious to consumers than the overall tight steel situation and warehousemen use extreme discretion in selling their stocks to avoid being unable to help meet emergency requirements for relatively small tonnages. Since warehouse receipts of a particular item may be received on a 60-day basis, these stocks must be carefully watched to prevent overselling. With the voluntary allocation plan now cutting into supply of plates and shapes far more than for other product, outlook with regard to proper inventory "mix" is bleak.

Cincinnati — Warehouse steel supplies are spotty, some jobbers being in more fortunate position than others on recent mill receipts. Nevertheless, overall demand is running far beyond supply. The market is featured by tightening in supply of cold-rolled bars.

Philadelphia — Jobbers are unable to keep anything like balanced stocks in major lines. Mill receipts are fairly sustained at volume of the past several weeks, but consumer demand is pressing.

Seattle — Jobbing houses report increased pressure from buyers who ordinarily have direct mill connections but find this supply restricted by the maritime strike. A large tonnage of miscellaneous warehouse stock is aboard strike-bound ships and all receipts are now by rail, at an average higher cost of $12 a ton. Jobbers are trying to spread supplies as thinly as possible. Coast mills are booked to the limit with large jobs and are not in position to ease the warehouse situation. The voluntary allocation program is taking a large amount of steel out of this area, while much material is being diverted to government projects.

Pipe Price Listing Corrected

Sharon, Pa.—Mercer Tube & Mfg. Co., this city, has made no change in mill discounts since Aug. 23. Discounts for galvanized standard steel pipe, random lengths, T. & C., under column D on page 62 of the Sept. 27 issue of STEEL were erroneous and should have been as follows: ⅛-inch, 12½; ¼-inch, 14; ⅜-inch, 9, effective as of Aug. 23; ½-inch, 20; ¾-inch, 24; 1-inch, 27; 1¼-inch, 27½; 1½-inch, 28; 2-inch, 28½; 2½ and 3-inch, 29, effective as of Aug. 9, 1948.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 224

Seattle — Local steel mills are making little headway against backlogs as new business is constantly pressing, many contracts for reinforcing calling for additional tonnage. Management is trying to care for regular customers and to expedite business on the books. The volume of small jobs, involving less than 100 tons, is tremendous and shows no abatement. Prices are no consideration, buyers asking only when material will be available.

Tubular Goods . . .

Tubular Goods Prices, Page 225

Boston — Realignment in source of supply has been completed by most steel pipe distributors affected by withdrawal of Bethlehem Steel Co. from Boston and other points where freight added to the Sparrows Point base price results in disadvantage. New suppliers are taking over at former Bethlehem allocation levels, but in some cases they also have withdrawn from competitive areas to get this additional volume for new accounts. Both Pittsburgh district and Ohio pipe mills have stepped in. In a few cases, pipe mills have elected to tighten up on additional distributor obligations and aim for industrial and utility volume; this is unearthing slightly more tonnage for utility buyers. There are no important changes in distributor relationships at Hartford, Springfield and Worcester.

Seattle — Cast iron pipe agencies report much potential business is proposed in this area, but meanwhile it is impossible to bid on new jobs as the delivery situation is more critical than ever. Several thousand tons of material are held up on idle ships between Mobile, Ala., and the Pacific Northwest. Contractors are pressing for delivery, but nothing can be done until shipping is resumed.

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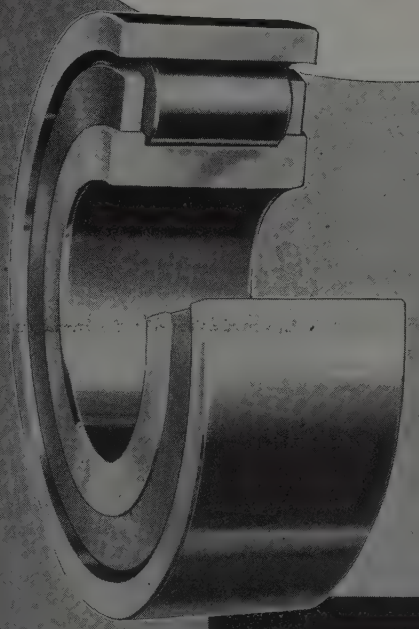

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Pig Iron . . .

Pig Iron Prices, Page 226

New York — Importations of pig iron continue to expand and at the present rate of increase arrivals in the last half of this year should amount to about 100,000 tons as against 50,000 tons for the first six months. Recent arrival of 900 tons of Indian iron at Philadelphia was the first sizable tonnage to have arrived in this country from India in quite a few years.

While foreign arrivals are small compared with domestic production, they nevertheless are helping to alevate the present stringency. In fact, with this foreign iron and some improvement in the domestic output, pig iron is not in as tight supply as it was a month ago, although it is still well short of demand. Contributing also to the slight easing is less tension in scrap. Here again demand is still active, but pressure is not as strong as it was several weeks ago.

Boston — Most furnaces normally selling in this territory meet real emergencies with small shipments. Coupled with some foreign deliveries and high scrap melt ratios, there will be few suspensions, if any, before the Everett, Mass., furnace resumes blast Nov. 1. Repairs at Mystic are on schedule. With the $3 advance at Buffalo, No. 2 foundry is now $55.67, Boston, including tax, although some iron is being delivered on a basis of $58.50, furnace, by one Buffalo stack. Few foundries are operating at better than 30 per cent iron in melts and the high ratio of scrap will continue even after Mystic tonnage is again available.

Pittsburgh — Downward trend in new orders booked by gray iron jobbing foundries making light castings is partially offsetting continued critical shortage of pig iron. Some interests have been forced to price themselves out of former markets because of steadily rising costs. Some have been forced to utilize a high percentage of exorbitantly priced cast scrap to offset the pig iron shortage. Carnegie-Illinois Steel Corp. blew in its No. 5 blast furnace at its Edgar Thomson Works Oc. 11, leaving only three out of the district's 47 units idle.

Philadelphia — The movement of iron is being hampered by shortage of gondolas. One leading producer, at least, is having to stock some iron because of inability to obtain sufficient cars. One factor in this shortage has been recent substantial arrivals here of foreign scrap, with imports of iron and ore also said to be adding to the car stringency.

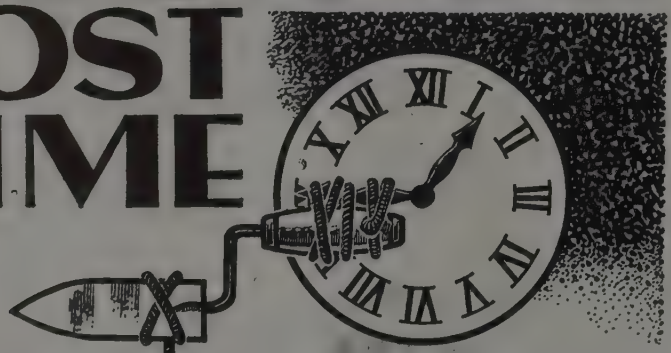
Buffalo—Across-the-board price increase of $3 a ton was posted last week on all grades of pig iron by the Hanna Furnace Corp., this city. New prices are: Basic and No. 2 foundry, $47; malleable, $47.50, and silvery, 6.01 and 6.50 per cent silicon, $60.75. All prices are f.o.b. furnace. The action was attributed to higher operating costs. Republic Steel Corp. is receiving $48 a ton, as it ties its pig iron price to that of No. 1 heavy melting scrap. Increased prices are having no immediate effect on market conditions. Buyers still consider prices secondary to being able to get iron. However, some tapering off has been noted among jobbing foundries. Aggregate business is running short of a year ago this time. In some instances, replacement orders are not forthcoming as rapidly as heretofore.

Cleveland — Globe Iron Co. and Jackson Iron & Steel Co., both of Jackson, O., increased blast furnace silvery pig iron $3 per gross ton f.o.b. Jackson Oct. 15. New price for 6.00-6.50 per cent silicon is $59.50.

Cincinnati — Receipts of pig iron fail to show improvement so that foundries are making the maximum use of scrap and are unable to operate even close to capacity. Even at the higher prices, foundries are desperate for more iron.

St. Louis — Pig iron stringencies, due to shutdown of one of Missouri-Illinois' stacks, is bringing occasional curtailment in foundries' operations here. Seasonal drop in cast scrap shipments is making that substitute for pig harder to obtain, with the result a few melters are shutting down a day or two a week. Some users are having difficulty making the "middle road" analysis iron, which Mo-Ill is turning out in the emergency, serve their individual purposes. Mo-Ill has cut each customer equally to 45 per cent of their previous tonnage, however, and those shipments are on schedule. Some of the complaints stem from foundrymen's desire to increase output of their products above postwar normal. Mo-Ill's relining work is two weeks behind schedule, but is expected to be completed about Nov. 1.

REDUCE LOST TIME due to REFRACTORY REPLACEMENT



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Scrap . . .

Scrap Prices, Page 230

New York — Brokers' buying prices are unchanged on all grades, except for heavy breakable cast, in which some easiness has developed. Current prices for heavy breakable range from $56 to $58 f.o.b. shipping point. The flow of domestic scrap is being maintained at a fairly good rate, with the situation with regard to inferior quality bundles having cleared up appreciably. Consumers are still rejecting some tonnage, but in general the quality of bundles is improved. Leading eastern consumer of heavy melting steel is said to have now received all shipments of German scrap against his original order for 55,000 tons, with one cargo being unloaded in Philadelphia and two more in Baltimore. This interest, however, contemplates sharing in further tonnages scheduled to be brought into this country from Germany. It is understood that England and this country have entered a new agreement whereby 375,000 tons of German scrap will be moved to the United States within the next couple of months or so.

Shipbreaking operations along the eastern seaboard have fallen off rather noticeably in recent weeks, as fewer ships are being sold for breakage.

Philadelphia — Demand for open-hearth scrap continues strong and, in the case of several hundred tons No. 1 railroad steel recently offered by a railroad, buying prices amounted to around $2 and $3 above the market for No. 1 heavy melting steel. This grade is of extra high quality and is being used for sweetening other materials for open hearth use.

Heavy breakable cast is slightly easier, now holding at $62 to $62.50, delivered. No. 1 wheels, on the other hand, are a trifle higher at $62 to $70, delivered.

Cleveland — Prices and movement of scrap remain relatively steady, although one consumer reports a slight slowing down of receipts of earmarked material for open hearths. The high rate of consumption, however, has prevented at least one consumer from making much headway in building inventories for winter. Shortage of railroad gondola cars also has been somewhat of a handicap in the movement of scrap. Scrap quality is unimproved and consequently, rejections continue high. Numerous offers of foreign scrap have been made here recently, but at least one consumer declines to place orders until the scrap actually reaches the U. S.

Buffalo—While the scrap market remains stalemated, shipments continue to pour in from the eastern seaboard via the Barge Canal. Eighteen barges and one steamer arrived in four days with nearly 12,000 tons of domestic and war scrap. Practically all receipts on the canal during the week were destined for the Bethlehem Lackawanna plant.

The influx of water-borne scrap is cited by consumers to offset talk about a stronger price structure. Dealers, however, refuse to accept orders below the prevailing price of $42.25 a ton for No. 2 heavy melting. In some respects, this price obviously is not indicative of a true market. Dealers admit paying above this price to cover orders. They are reluctant, however, to discuss various tie-in features of orders which make it possible to pay above the quoted price to cover commitments.

In addition, Pittsburgh consumers are again paying springboards on sales negotiated in the midstate area which usually forwards collections to Buffalo buyers.

Chicago—Increasing selectiveness of mills in taking open-hearth material indicates their relatively strong postition. While rejections are by no means common, more attention to quality is evident. Good flow of steelmaking scrap at formula prices would seem to preclude any upward move in the price level and resistance to any reduction appears equally strong at this time. Railroad items, which in many observers' opinion were overpriced in relation to industrial scrap generally, have been easing off. Prices for foundry grades are also easier as result of buying resistance by melters.

Cincinnati — Scrap prices are unchanged, but the undertone is strong. Mills and foundries, who are fairly well supplied for about 30 days and are receiving a normal volume of material, are resisting higher prices. Collections show improvement, but there are occasional reports of dealers holding material on speculation.

Seattle — Steel scrap is arriving in good volume at the mills, but in the face of capacity consumption inventories are not increasing as much as desired with winter weather ap-

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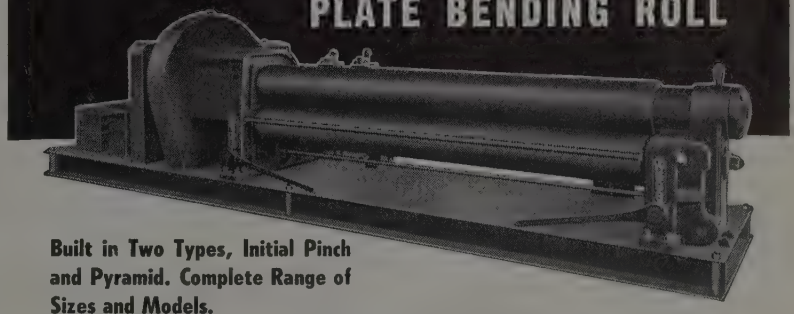

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proaching. Buyers are worried about the near future, as the supply of surplus ships for breaking is nearing exhaustion. No immediate scrap collection program has been planned in this area, but every available source is being tapped. Some dealers have sizable stocks which are being held for a higher market. Another factor is that many automobiles, which under normal conditions would be scrapped, are still on the roads.

Pittsbugh — Advance in pig iron prices has resulted in higher cast scrap prices this week. Charging box scrap is up $2; heavy breakable, $3; malleable, $4 to $5. Higher scrap prices also noted for railroad axles and rails. Railroad specialties are off about $1.75. Heavy influx of scrap has enabled mills to augment inventories in recent weeks. Prices for open-hearth scrap grades continue at formula levels with possibility of lower prices before year end.

Alloy Grade Extras Revised

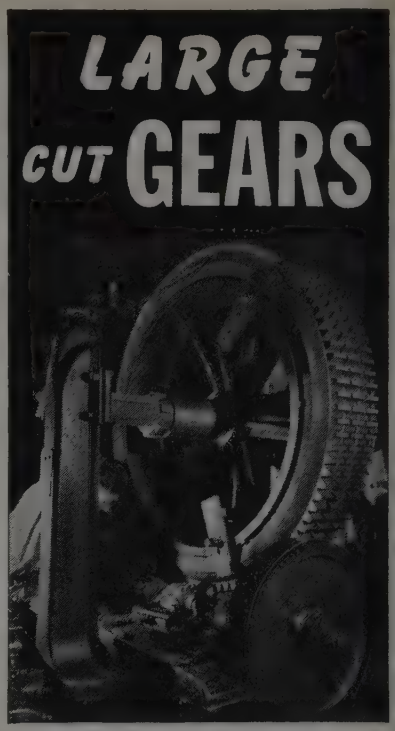
Pittsburg — Carnegie-Illinois Steel Corp.has increased its grade extras on alloy steel products an average of $5.50 a ton, or 4.6 per cent, effective as of Oct. 15. The company announced that the increases ranging from 8 per cent to 20 per cent in the cost of purchased alloying elements, such as ferromanganese, ferrochromium, ferrosilicon and nickel occasioned the upward adjustments in the alloy steel extras.

In addition, size extras of flat bar alloy products have been increased by the company an average of $5 per ton, or 4 per cent, reflecting past production costs which were not taken into consideration in previous price revisions. Alloy steel products account for less than 4 per cent of the company's overall steel production.

While pig nickel price was raised 18.3 per cent Oct. 1, the advance represents 24 per cent translated into additional cost of producing alloy steel products after allowance for scrap credit. Similarly, the 19.3 per cent increase in ferrosilicon price constitutes an advance of 31 per cent related to alloy steel items. Lowest increased cost factor is nickel of 8.2 per cent in price, or 13.3 per cent on alloy products.

Increase in grade extras range from $2 to $10 per ton and are applicable on all steel products, including ingots. Largest increase of $10 is applied to AISI Nos. 3310 and 2512, containing high percentages of nickel; lowest of $2 is on 1320 series containing only silicon and manganese alloying elements.

Upward price revisions on size extras for alloy bar flats also range from $10 to $2 with extras for a few very large size classifications unchanged. Width and thickness ranges for this size extra group have been revised to coincide more closely to size extra price basis on alloy rounds and squares in respect to square footage rolled. Largest price advance on size extras for alloys, therefore, are applicable on narrow gages and widths.



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STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

13,000 tons, United Nations development, New York, to American Bridge Co., Pittsburgh.

2600 tons, smelter and boiler house, Phelps-Dodge Corp., Ajo, Ariz., to Ingalls Iron Works, Birmingham, Ala.

1760 tons, state grade crossing, Rosedale, Long Island, through the T. & T. Contracting Co., to American Bridge Co., Pittsburgh.

1200 tons, state overpass, Elsmere, Del., to Bethlehem Steel Co.

1000 tons, Public School No. 8, Jersey City, N. J., to Bethlehem Steel Co.

710 tons, storage building, Grand Coulee dam, spec. 2400, Bureau of Reclamation, Odair, Wash., to American Bridge Co., Pittsburgh.

600 tons, plant addition, American Can Co., Hillside, N. J., to American Bridge Co., Pittsburgh.

287 tons, power house, Cliffs Power & Light Co., Ishpeming, Mich., to American Bridge Co.

240 tons, fertilizer plant, Wilmington, N. C., to the Luria Engineering Co., New York.

200 tons, public school, Philadelphia, to Bethlehem Steel Co.

174 tons, Taylor gymnasium, Lehigh University, Bethlehem, Pa., to Bethlehem Steel Co.

150 tons, new law school, University of Buffalo, to R. S. McMannus Steel Construction Co., Buffalo; Siegfried Construction Co., Buffalo, general contractor.

187 tons, bridge, Chicago, Burlington & Quincy Railroad, Spec. 422.79, Crawford, Neb., to American Bridge Co.

130 tons, Third Avenue Bus terminal, New York, to Schacht Steel Construction Inc., that city.

112 tons, bridge, Union Pacific Railroad, Twin Falls, Idaho, to American Bridge Co.

100 tons, telephone building, Kearney, N. J., to the Weatherly Steel Co., Weatherly, Pa.

100 tons, new building, National Battery Corp., Depew, N. Y., to R. S. McMannus Steel Construction Co., Buffalo; Siegfried Construction Co., Buffalo, general contractor.

100 tons, unstated government project, to Isaacson Iron Works, Seattle.

STRUCTURAL STEEL PENDING

2000 tons, telephone exchange, Portland, Oreg.; bids in Oct. 11.

1300 tons, engineering school, University of New Hampshire, Durham, N. H.

1140 tons, Federal Reserve bank, Seattle; bids pending.

800 tons, Davis power plant, Louise, Ariz., Bureau of Reclamation, spec. 2431; bids asked.

500 tons, bridge, Sec. B-1 of 17-8-2, C2, Chippewa County, Mich.; bids received Oct. 5.

300 tons, powerhouse, Fitchburg Gas & Electric Co., Fitchburg, Mass.

300 tons, addition, Schmidt brewery, Philadelphia; bids asked.

250 tons, engineering school building, University of New Hampshire, Durham, N. H.

250 tons, Kresge store, Harrisburg, Pa.; pending.

223 tons, state bridge, Schuylkill county, Pennsylvania; bids Oct. 29.

200 tons, Du Pont factory, Karney's Point, Pa.; bids asked.

153 tons, state bridge, Lackawanna county, Pennsylvania; bids Oct. 29.

Unstated, transmission towers; bids to Bonneville Power Administration, Portland, Oreg., Oct. 18; spec. No. 4358.

REINFORCING BARS . . .

REINFORCING BARS PLACED

600 tons, Veterans hospital, Miles City, Mont., to Bethlehem Pacific Coast Steel Corp., Seattle; Lease & Leigland, Seattle, general contract.

300 tons, miscellaneous small building and industrial contracts, to Northwest Steel Rolling

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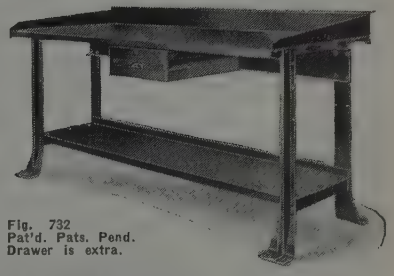

Fig. 732
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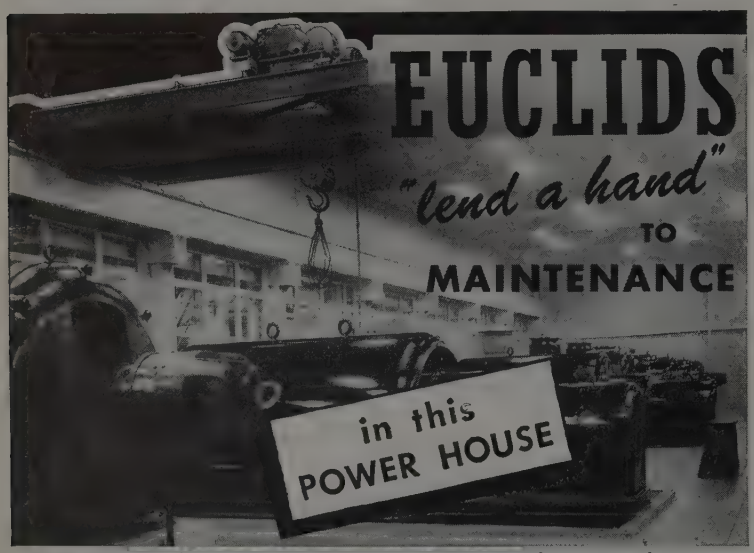

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Mills Inc., Seattle.

250 tons, University of Washington Fisheries center, Seattle, to Bethlehem Pacific Coast Steel Corp., Seattle; H. L. Becker, Seattle, general contract.

REINFORCING BARS PENDING

1400 tons, Veterans hospital, Seattle; general contract awarded Sound Construction & Engineering Co., Seattle, low $6,077,320.

645 tons, state road work, Washington, Fayette and Westmoreland counties, Pennsylvania; bids Oct. 29.

400 tons, unstated project, Spokane, Wash.; bids in.

250 tons, Sears, Roebuck & Co., building, Bellingham, Wash.; H. S. Wright, Seattle, general contract.

132 tons, highway bridge, Chippewa county, Mich.; John K. Jackson, Ironwood, Mich., low.

108 tons, state bridge, Schuylkill county, Pennsylvania; bids Oct. 29.

107 tons, St. Francis of Rome school, Cicero, Ill.; bids Oct. 7.

100 tons, two Washington state highway bridges; general contracts placed.

100 tons, 150-foot state highway bridge, Wibaux county, Montana; bids to Helena, Oct. 20.

Unstated, vehicle tunnel, Greyhound bus station, Lake St. and Garvey Court, Chicago; bids Nov. 1.

PLATES . . .

PLATES PLACED

1450 tons, tanks, Texas Co., Cleveland, to Hammond Iron Works, Warren, Pa.

450 tons, Shell Oil Co., three tanks at Seattle terminal, to Chicago Bridge & Iron Co., Chicago.

400 tons, H and steel sheet piling, Agate Pass Washington state bridge, to Bethlehem Pacific Coast Steel Corp., Seattle.

220 tons, hull plates, Navy, east and west yards, spec. 6681, to Carnegie-Illinois Steel Corp.

109 tons, floor plates, Navy, east and west yards, spec. 6679, to Alan Wood Steel Co., Conshohocken, Pa.

PLATES PENDING

150 tons, 500,000-gallon standpipe type steel water tank, Bonneville project; bids in to Corps of Engineers, Portland, Oreg.

Unstated tonnage, two 120-foot diesel electric single screw lightships, U. S. Coast Guard, Washington; bid date to be announced.

PIPE . . .

CAST IRON PIPE PENDING

1400 tons, 3000 feet, six-inch, 40,000 feet, eight-inch, and 10,000 feet, 12-inch, cast iron pipe, Worcester, Mass.; R. D. Wood Co., Philadelphia, low; bids to Bureau of Water Supply.

STEEL PIPE PENDING

Unstated, 13,360 feet of 12 and 16-inch steel water pipe; bids in at Walla Walla, Wash.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Southern Railway, 95 diesel locomotives, including sixty-four 1500 horsepower freight units and six 2000 horsepower passenger units to Electro-Motive Division, General Motors Corp., LaGrange, Ill., and 25 road switching locomotives to American Locomotive Co., New York.

LOCOMOTIVES PENDING

Great Northern, two 6000 horsepower, ten 1500 horsepower, twelve 1000 horsepower diesel locomotives; purchase authorized.

RAILROAD CARS PLACED

Southern Railway, 1000 steel box cars, to own shops at St. Cloud, Minn., and Superior, Wis.

St. Louis-San Francisco, 400 seventy-ton gondolas, to Pullman-Standard Car Mfg. Co., Chicago.

"MUST IT RUST?" A three billion dollar question that is dramatically answered in our 16 mm sound motion picture. This educational film is one that interests both consumer and producer—and everyone who is concerned with the problems of rust and corrosion should see it.

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CONSTRUCTION AND ENTERPRISE

CALIFORNIA

BELL GARDENS, CALIF. — Pacific Iron & Steel Co., 11633 S. Alameda St., Los Angeles, will erect a $74,000 metal factory building here at 3420 Garfield Ave.

ESCONDIDO, CALIF.—W. J. Jack, Cleveland, will construct an aircraft parts factory at Engals Airport, and after the plant is in production, will build 400 dwellings for company employees.

IOWA

FAIRFIELD, IOWA—Dexter Washing Machine Co., Tom B. Hunt, president, has purchased the Nash-Kelvinator interests in Appliance Mfg. Co., Gaskill Rd., Alliance, O., manufacturer of washing machines.

KENTUCKY

DEANE, KY.—Consolidation Coal Co. has awarded a $1 million contract to Roberts & Schaefer Co., 307 N. Michigan St., Chicago, for a coal tipple.

GAYHEART, KY.—Inland Steel Co. has awarded a $300,000 contract to Rust Engineering Co., Exchange Bldg., Birmingham, Ala., for a coal tipple.

PIKEVILLE, KY.—A. J. Dalton plans to build a $100,000 coal preparation plant.

OHIO

AKRON — Air-Flo Compressor Co., W. V. Fischer, president, will begin "pilot plant" operations of a new compressor at 357 W. Thornton St. After extensive development work, the company can now build 102 different compressor models from only 24 principal parts.

ALLIANCE, O.—Banco Die Inc., recently incorporated by John S. Need, 81 W. Harrison St.; Leslie N. Bardo, 635 N. Leslie St.; and Mark Conti, agent, RFD #2, will construct a plant on N. Union Ave. to manufacture dies, tools and other fixtures.

CLEVELAND—Jones & Laughlin Steel Corp. will build three warehouses at 731 Clark Ave. at a cost of $210,000.

CLEVELAND—Kilby Mfg. Co., 4623 Lakeside Ave., John C. Nierath, president, has sold 75% of its stock for about $600,000 to a group of Chicago industrialists including Samuel L. Winternitz & Co. The company manufactures sugar machinery and makes large steel castings.

CLEVELAND—Harris-Seybold Co., 4510 E. 71 St., manufacturer of offset lithographic printing presses, power paper cutters and other related graphic arts equipment, is moving into a new engineering building which will be devoted exclusively to research on presses. This building cost $125,000 exclusive of equipment. The company is also enlarging its chemical laboratory, and at the Dayton unit, provisions have been made to include the manufacture of presses as well as power paper cutters, stitchers and drills.

CLYDE, O.—Clyde Porcelain Steel Corp. is planning to construct a $1 million building for expansion of operations for the Bendix Corp. and also to install equipment costing $1 million.

GIRARD, O.—Republic Steel Corp. has leased 75 acres of the site of the old A. M. Byers Co. Plans call for development of the property as a possible location for plants that could use steel produced here.

HUBBARD, O.—American Industrial Co., Buffalo, will build a $500,000 paper mill designed to produce 50 tons of newsprint daily. Newsprint will be made by de-inking of old newspapers.

MANSFIELD, O.—Taylor Metal Products Co.,

Get these new facts on Arc Welding to decision-makers in your plant

This easy-to-take 'Pack of Facts' makes the information crystal-clear

Today's arc welding offers the key men in your plant unprecedented opportunities to cut costs... improve quality... lick difficult production problems. Get them the latest facts on this versatile industrial tool *now!*

IT'S EASY—General Electric, as a service to industry, has prepared the facts for you in visual terms that are easy-to-take... linger in the memory.

Here's what the arc welding program offers:

1. A fact-packed manual, describing practical applications of electric arc processes... production feats. *Without sales bias,* it surveys the field *authoritatively.*

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3. Fully-illustrated highlights booklets, for individual study and review.

Convince yourself first—

We want *you* to be the judge of what these arc welding facts can do. That's why we offer business executives this chance to examine the *Arc Welding Manual* without cost.

Showings Cost You Nothing—With your manual, we'll tell you how to arrange for a FREE SHOWING of the film.

FREE TO BUSINESS MANAGEMENT

Attach to your business letterhead

General Electric Co.
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Schenectady 5, N. Y.

Please mail me a sample copy of the G-E *Arc Welding Manual* without cost or obligation, with details on how I can arrange for a FREE SHOWING of the film. (Extra copies at regular manual price—$1.25.)

Name_____ Title_____
Company_____
Street_____
City_____

GENERAL ELECTRIC

335 W. Sixth St., has been organized by Glenn W. Taylor, 104 W. First St., with authorization to issue 2000 shares of no par common stock to manufacture, stamp, fabricate and deal in metal and metal products.

PENNSYLVANIA

McKEESPORT, PA.—Kelsey-Hayes Wheel Co., L. R. Downie, vice president, Detroit, will take over the McKeesport works of Jones & Laughlin Steel Corp. They are installing equipment for wheel manufacturing and will take over orders for the fabrication of river barges and mine cars.

WASHINGTON

BREMERTON, WASH.—City has awarded contracts to Hoagland-Findlay Eng. Co., Long Beach, Calif., for a $258,000 treatment plant, $117,000 pumping stations, and also to Malaspina & Napoli, Seattle; for $14,000 outfalls, and to Henry Finch, Seattle, for a $54,000 submarine line.

SEATTLE—University of Washington is planning to build a $1,200,000 auditorium and music building; plans by John P. Jones and Leonard Bindon, Seattle.

SEATTLE—*West Coast Lumberman* conducted a survey which indicates that $100 million is being expended in new construction and rebuilding of sawmills and other wood processing plants in British Columbia and the Pacific states.

WEST VIRGINIA

WEIRTON, W. VA.—Signode Steel Strapping Co., John M. McGregor, vice president in charge of operations, Chicago, will erect a manufacturing plant near here to manufacture flat steel strapping for packaging purposes and carloading for all types of industry. Operations will consist of slitting steel, edge rolling it, coloring, coating, rustproofing, recoiling, wrapping and packaging.

FERROALLOYS

(Continued from Page 227)

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk, 10.00c per lb of briquet, c.l. packaged 10.80c, ton lot 11.6c, less ton 12.5c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 10.0c per lb of briquet, c.l. packed 10.8c, ton lot 11.6c, less ton 12.5c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 5.75c per lb of briquet, c.l. packed 6.55c, ton lot 7.35c, less ton 8.25c. Delivered. Spot, add 0.25c.

(Small size—weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 5.90c, c.l. packed 6.70c, ton lots 7.50c, less ton 8.40c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18%, and Si 53-59%). Contract, carload, lump, bulk 19.25c per lb of alloy, carload packed 20.05c, ton lot 21.55c, less ton 22.55c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 17.9c per lb of alloy, carload packed 19.1c, ton lot 21.0c, less ton 22.5c. Delivered. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max., Si 4% max., C 0.10% max.). Contract, ton lots, 2" x D, $1.40 per lb of contained Ti; less ton $1.45. (Ti 38-43%, Al 8% max., Si 4% max., C 0.10% max.). Ton lot $1.28, less ton $1.35. Fob Niagara Falls, N. Y., freight allowed to St. Louis. Spot add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract, $160 per net ton, fob Niagara Falls, N. Y., freight allowed to destination east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21% C

When
HEATING FURNACE
Repair and Outage Costs Climb

Remember
REMMEY
RM
SEMISILICA BRICKS

Heating furnace roofs, open hearth regenerator roofs, hot blast stoves and other mill furnaces operating continuously enough to cause "first quality" and "super duty" brick to vitrify and spall . . . yet which are shut down frequently enough to cause silica brick to spall . . . need Remmey RM semisilica brick.

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RICHARD C. REMMEY SON CO.
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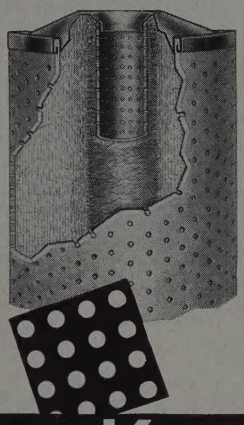
Genuine Baldwin OIL FILTER

CLEANS OIL WITH H & K PERFORATED METALS

J. A. Baldwin Mfg. Co., Ashland, Wisconsin, has used **H & K Perforated Metals** for many years in the manufacture of the Genuine Baldwin Oil Filter element. The perforated center tube is a basic feature in maintaining the straining and cleansing action of this popular filter.



Whatever your requirements in filters, screens, grilles, baffles and the like, remember **H & K.** With a wider variety of sizes, shapes and spacings, H & K precision-perforates nearly every metal as well as plastics, fabrikoids, plywood and other sheet materials.

Write for literature

The Harrington & King PERFORATING Co.

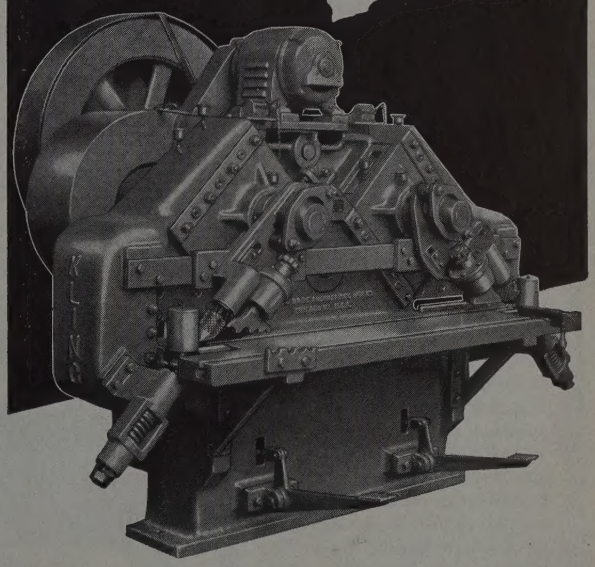
5634 Fillmore St., Chicago 44, Ill. 114 Liberty St., New York 6, N. Y.

FRICTION KILLS SHOOTING STARS. ON THE OTHER HAND, CADMAN FINE BEARING METALS KILL FRICTION.

The important part played by bearing metal emphasizes the great need of a more careful consideration of what is required of a babbitt in its selection. Our 87 years of experience qualifies us as bearing metal experts. We are always happy to help solve bearing problems. Ask us any time.

A.W. CADMAN MFG. CO.
PITTSBURGH, PA.

SLASH SHEARING COSTS with Kling Double Angle Shears



Especially designed for high speed, high production shearing. Will handle flat and round mild steel bars in addition to structural and bar angles. Round bars and bar angles are sheared on the left side, while the right side is used for structural angles and flat bars.

These special shears are equipped with automatic hold downs and "Y" type roller supports, also a removable guide for flat bar shearing. *Recommended for straight shearing only.* Mitreing can be accomplished by removal of holddowns. Available in four sizes.

Write today for full particulars.

Kling BROS. ENGINEERING WORKS

Manufacturers of Rotary, Plate, Bar Shears, Combination Shears, Punches and Copers, Single and Double End Punches, Angle, Beam, Bar and Plate Benders, High Speed Friction Saws.

1328S NORTH KOSTNER AVENUE CHICAGO 51, ILLINOIS

3-4.5%). Contract, $175 per ton, fob Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

VANADIUM ALLOYS

Ferrovanadium: Open Hearth Grade (Va 35-55%, Si 8-12% max., C 3-3.5 max.). Contract, any quantity, $2.90 per lb of contained Va. Delivered. Spot, add 10c. **Crucible-Special Grades** (Va 35-55%, Si 3.25-4% max., C 0.5-1% max.), $3. **Primos and High Speed Grades** (Va 35-55%, Si 1.50% max., C 0.20% max.), $3.10.

Vanadium Oxide: Contract, less carload lots, $1.20 per lb of contained V_2O_5, fob Bridgeville, Pa. Spot, add 5c.

Grainal: Vanadium Grainal No. 1, 93c; No. 6, 63c; No. 79, 45c; all fob Bridgeville, Pa., usual freight allowance.

TUNGSTEN ALLOYS

Ferrotungsten: (W 70-80%). Contract, 10,000 lb W or more, $2.25 per lb of contained W; 200 lb W to 10,000 lb W, $2.35; less than 2000 lb W, $2.47. Spot, add 2c.

Tungsten Powder: (W 98.8% min.). Contract or spot, 1000 lb or more, $2.90 per lb of contained W; less than 1000 lb W, $3.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloys: (Zr 12-15%, Si 39-43%, Fe 40-45%, C 0.20% max.). Contract, c.l., lump, bulk 6.6c per lb of alloy, c.l. packed 7.35c, ton lot 8.1c, less ton 8.95c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max.). Contract, carload, lump, packed 20.25c per lb of alloy, ton lot 21c, less ton 22.25c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min., Si 1.50% max., Al 0.50% max., C 0.50% max.). Contract, 100 lb or more. 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered. Spot, add 5c.

Borosil: (3 to 4% B, 40 to 45% Si), $6.25 per lb contained B, fob Philo, O., freight not exceeding St. Louis rate allowed.

Bortam (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 0.90 to 1.15%). Net ton to carload, 8c per lb, fob Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Mn 5% max., Si 8% max., C 0.5% max.). Contract, ton lot, 2" x D, $2.75 per lb of contained Cb, less ton $2.80. Delivered. Spot, add 10c.

CMSZ Mixes: (No. 4—Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75%, C 3-4.5%; No. 5—Cr 50-56%, Mn 4-6%, Si 13.50-16.0%, Zr 0.75-1.25%, C 3.50-5%). Carload, 12 M x D, carload packed 19.0c per lb of material, ton lot 19.75c, less ton 21.0c. Delivered.

Silcaz Alloy: (Si 35-40%, Ca 9-11%; Al 6-8%, Zr 3-5%, Ti 9-11%, Boron 0.55-0.75%). Carload, packed, 1" x D, 43c per lb of alloy, ton lot 45c, less ton 47c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.). Contract, carload, packed, ⅛" x 12 M, 16.5c per lb of alloy, ton lot 17.25c, less ton 18.5c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 42-46%, Ca 5%, Ti 9%). C.l. packed, 16.50-17.00c per lb of alloy; ton lots 17.90-18.00c; less ton lots 19.40-19.50c, fob Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%; V-7, Cr 28-32%, Si 15-21%, Mn 14-16%). C.l. packed, 14.25c per lb. of alloy; ton lots 15.75c; less ton lots 17.00c, fob Niagara Falls, N. Y.; freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Al). Packed, lump, carload 11c, ton lots 11.25c, smaller lots 11.75c per lb alloy; freight not exceeding St. Louis rate allowed.

Ferrophosphorus (23-25% based on 24% P content with unitage of $3 for each 1% of P above or below the base): Gross tons per carload, fob sellers' works, Mt. Pleasant, or Siglo, Tenn.; $65 per gross ton.

Ferromolybdenum: (55-75%). Per lb, contained Mo, fob Langeloth and Washington, Pa., furnace, any quantity 95.00c. Effective Jan. 1, 1949, price will be $1.10, Langeloth.

wonderful

Oakite Composition No. 90 for reverse-current cleaning

You never know how good an electrocleaner can be until you watch Oakite Composition No. 90 go to work on oils, greases, smuts, all the objectionable films that interfere with good electroplating on steel.

"No. 90" makes a wonderfully well-balanced solution that does everything just right. It has high conductivity that keeps oxygen bubbling off the work at a merry, dirt-chasing clip. It raises a thin blanket of fine bubbles just strong enough to keep the alkaline spray from being a nuisance around the tank; just brittle enough to prevent development of thick, explosive foam. For wetting and dispersing action, for water-softening, for every useful purpose, the ingredents of Oakite Composition No. 90 have been selected with care and apportioned with precision. The result: a solution that is perfect for reverse-current cleaning.

You'll get a kick out of seeing Oakite Composition No. 90 in action. Phone the Oakite Technical Service Representative in your vicinity (or write direct to us) to arrange a free demonstration that will make you glad you asked.

OAKITE PRODUCTS, INC.
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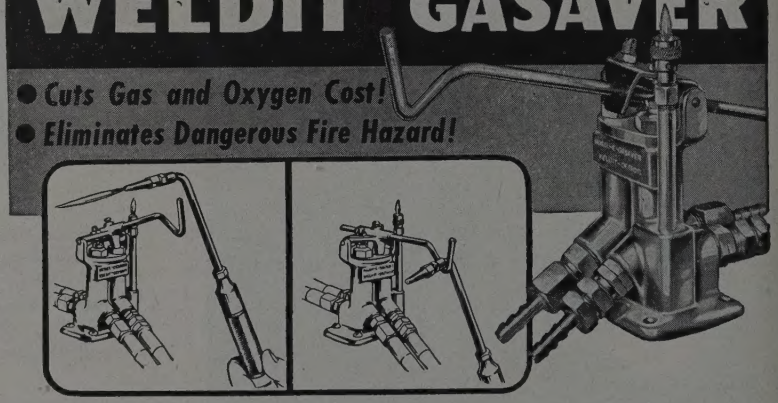
Technical Service Representatives Located in Principal Cities of United States and Canada

OAKITE

Specialized Industrial Cleaning
MATERIALS • METHODS • SERVICE

WELDIT GASAVER

● Cuts Gas and Oxygen Cost!
● Eliminates Dangerous Fire Hazard!



With Weldit Gasaver installed the operator simply hangs his torch on the handy lever rod of the Gasaver. The weight of the torch pulls the lever rod down, closing the valves of the Gasaver, thus shutting off both gas and oxygen intake lines. The usual idle flame and needless waste of oxygen and gas between operations is thus eliminated—no fire hazard or danger of injury to workers.

When the torch is again picked up for further welding operations, the operator passes it across the pilot light of the Gasaver, thereby instantly igniting the torch at the preadjusted flame, ready for work—no adjustments to make.

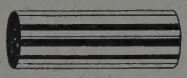
Gasaver can be installed any convenient place on the line between regulators and torch. Most of America's largest production plants are now Gasaver equipped.

Listed as standard by Underwriters' Laboratories and by New York City Board of Standards and Appeals.

Some distributor territory still available.

996 OAKMAN BLVD. Weldit INC. SINCE 1918 DETROIT 6, MICH.

The Old Way

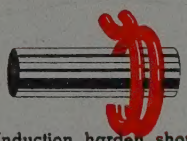


1 Start with 1⅝" round, 4½" long. Weight 2.64 lbs.

2 Stock: S. A. E. 1060 annealed for machinability.

3 Machine to 1.3780" diameter, except shoulder 3/32" wide and .111" high. .736 lb. of metal removed.

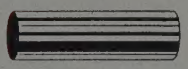
4



5 Induction harden shoulder to Rockwell C 62.

6 Grind shaft both ends.

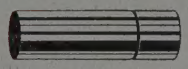
with RELIANCE RINGS



1 Start with 1.3780" round, 4½" long. Weight 1.89 lbs.

Saving .75 lb.

2 Stock: S. A. E. 1060, turned and ground.



3 Machine groove .105" wide and .045" deep. Approximately .004 lb. of metal removed. .732 lb. less metal to remove.

Note saving of machining.

4 Assemble ring in groove.

A simple operation.

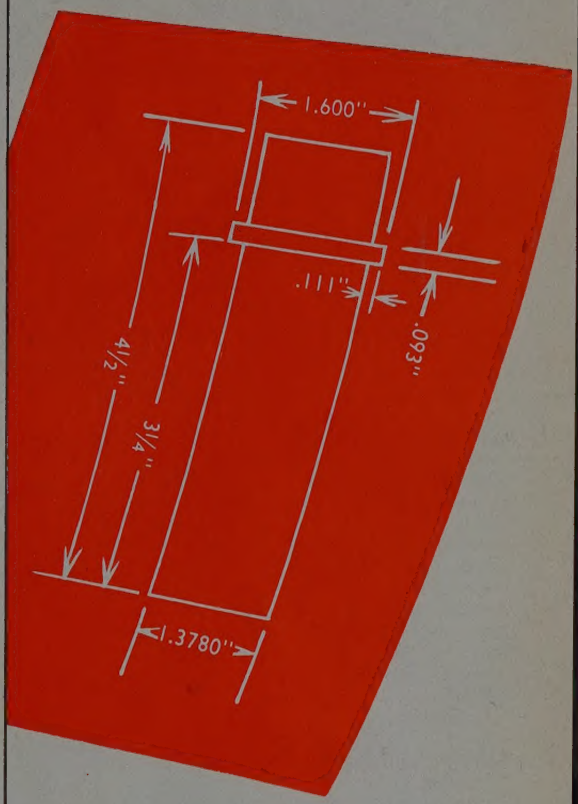
5 Ring already hardened.

No heat treating necessary.

6 Shaft already ground.

No grinding necessary.

Assembly has ultimate shear strength of 37,000 lbs., when snap ring and shaft are of the same hardness. Will withstand pressures in excess of 5000 lbs.



re there any *Savings like this* in your product?

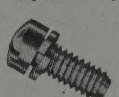
The illustration shows a common cost-cutting application of Reliance Rings in the production of shouldered shafts. They may also be used to produce shoulders in bores.

Made from carbon, alloy or stainless steel, or non-ferrous metal to specified physicals . . . of any desired cross section and diameter . . . welded or open with ends shaped to meet any requirement . . . Reliance Rings offer limitless possibilities for reducing costs, speeding production and improving product performance.

DESIGN ENGINEERS - PLANT OPERATING MEN — Let Reliance Engineers help you reduce costs through the use of Reliance Rings in your product production. Write today.

RELIANCE SPRING LOCK WASHERS

— in American Standard sizes — compensate for looseness of bolted parts. Keep bolted assemblies tighter longer.



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The all-in-one unit, quality spring lock washer pre-assembled on a bolt or screw. Cuts production cost by increasing production efficiency.

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Behind the Scenes . . .

Come On Over

Since this issue is being distributed to every booth in the Metal Show, we want to devote this first paragraph to an invitation to all you good people who are there in person to drop in at our booth, No. 1744, deep in the heart of the Commercial Museum building, and vote on our machines for the candidate of your choice. Also, by the time you have wandered into the heart of the show, you may want a re-orientation of your whereabouts. For that purpose, we've prepared maps of the show, with the location of every exhibitor, and we'd be very happy to give you one so that you can continue your journey and even find your way out again with no further difficulty. Another display we think you may find interesting is a case holding an entire year's issues of STEEL—a complete record of the metalworking industry since last year's Metal Show in Chicago.

Non-Poisonous Campaign

Since the elections are now only 8 days away, and the hot air, gases and fury are piling up in great gobs all over the place, it's a little refreshing to note that up in Connecticut there's one candidate who has a constructive plank in his platform. He's Victor W. Knauth, and he's promising the voters of Wilton, Conn., that if he's elected, he'll rid the town of poison ivy. That's a laudable ambition, and although we are far removed from the subject city, we think we ought to endorse the candidacy. In fact, it seems like such a good idea that we're going to slip the idea to a couple of office seekers in our own home village, where the druggists get rich on calamine lotion sales.

Home Is Where the Heart Is

We couldn't check this one for sure, but a friend of ours reported that he saw an ad in a central Ohio newspaper which ran something like this: "Widower, under 40, would like to meet childless widow under 30 with house. Please enclose photo of house."

More Copies Coming

We are putting the Guide to the Steel Industry's New Pricing System back on the press, after running completely through the first stack of orders. Be very happy to have our Readers Service Department send you as many copies as you want, 25 cents each for the first ten, and a dime apiece for all over ten. After checking through all the flowery letters of praise from you nice readers out there, we are real proud of our editors for cooking up the first complete roundup of price data, telling who was selling what steel products where and for how much.

Everything Is Rosy Now

Always on the outlook for indications of the future trend of business, we were a little bit puzzled to note in our October 18 issue that the Cincool Division of the Cincinnati Milling Machine Co. featured a pair of rose colored glasses. Our economic experts around here believe that the outlook looks rosy enough with any kind of glasses at all—or with none, for that matter. At any rate, whether you have to use rose colored glasses or not, it was a clever tie-in with the color of that company's product.

Shirts—For Free

Special note to experts on blooming mill rolls—did you see where "Red" Wabbler, the cigar smoking character who inhabits the Mackintosh-Hemphill ads, is willing to give you the shirt off his back in exchange for a little information? See page 203 of our October 18 issue for details, if you need a couple of new shirts!

Shouldn't Happen to a Dog

The labor situation in these United States sometimes gets a little on the ludicrous side, particularly when unions are warring over which one is to do what. They haven't yet reached the ultimate state of a certain union down under in New Zealand, which has lodged a formal complaint of unfair labor practice because a certain electrical contractor had used the services of a non-union worker. This worker was a ferret, which was used to drag 600 feet of wire through a conduit! Seems like it would take a mighty small man to do that job, no?

Shrdlu

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STEEL

Vol. 123—No. 17 October 25, 1948

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